[From Hieronymus Mercurialis: Praelectiones Patavinae. Venetiis, 1603.]

ANNALS OF MEDICAL HISTORY

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TOUCHPIECES & THE CURE OF THE KING'S EVIL*

By SIR D'ARCY POWER, K.B.E., F.R.C.S. ENG., F.S.A.

LONDON

THE term "King's Evil" has been applied from time immemorial to the disease which was afterwards called struma or scrofula and which we now know to be tuberculous. It bore especial reference to enlarged cervical glands which in an age when no surgical treatment was employed for their eradication or cure usually ulcerated, the ulcers, owing to the dirty habits of the people becoming septic and chronic.

From very early times in France and in England the disease was treated in two radically different ways. By medical men it was treated under the general name of struma; by Kings it was cured by the laying on of hands. Struma in the minds of the sixteenth century doctors, not to go back to a still earlier period when the pathology of the disease was even more involved, included not only the enlarged glands of the neck due to septic absorption from the teeth, the ears and the head but also such swellings as dermoid cysts, myeloid sarcomata and wens. The condition was carefully examined by William Clowes (1540?–1604) who was surgeon to St. Bartholomew's Hospital, in the latter part of the reign of Queen Elizabeth; by Richard Wiseman (1622?–1676) the surgeon in attendance upon Charles II and by John Browne (1642–1700?) who was charged with the investigation of all patients suffering from struma before they were touched by King James II. The means for cure adopted by these surgeons and their contemporaries consisted of external applications in the form of lotions, liniments and ointments; in dietetic measures and in change of air and surroundings. These were all very well in their way but popular belief was in favor of cure by the Royal Touch and for this purpose thousands of patients travelled from remote parts of England to London or crowded to the King's lodgings when he went on progress to places in the provinces. It is still in dispute whether the gift of healing was first exercised in France or in England. The French assert that it was exercised by Clovis in A.D. 481 and that Louis I (936–954) added the sign of the Cross during the ceremony in token of humility and to show that the gift was not inherent but proceeded from God. However this may be it is certain that the English monarchs possessed the gift, at any rate from the time of King Edward the Confessor (1003?–1066). It cost the English Kings less than the French, for whereas in France the King had to fast for nine days and do other penances before he could exercise his gift, the power was inherent and a part of the King himself in England. Thus Malcolm says in Macbeth:

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* Read before the Section on Medical History of the College of Physicians of Philadelphia, December 8, 1930.

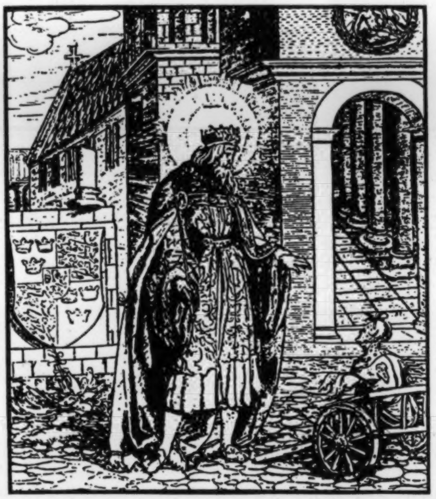

FIG. I. EDWARD THE CONFESSOR APPLYING FAITH HEALING.

> Tis called the Evil;
> A most miraculous work in this good King;
> Which often since my here-remain in England,
> I've seen him do. How he solicits heaven
> Himself knows best; but strangely-visited people.
> All swol'n and ulcerous, pitiful to the eye,
> The mere despair of surgery, he cures
> Hanging a golden stamp about their necks
> Put on with holy prayers; and 'tis spoken,
> To the succeeding Royalty he leaves
> The healing benediction.

On the other hand if the French King underwent penance to exercise the gift, it was less expensive to his treasury. In England every person touched received a piece of gold; in France every Frenchman was presented with fifteen sous and every foreigner with thirty sous.

The ceremony of touching for the King's Evil was impressive and there are many accounts of it. The best that I have read is by Dr. John Browne whom I have already mentioned. He was one of the examining surgeons to Charles II, James II, and William III and in the twenty years he served twenty thousand persons were touched. He says:

> The surgeon having discovered the disease by examination, grants a certificate to that effect, and tickets being delivered out to the afflicted, they are presented to his Majesty, by the surgeon who kneels and he thus delivers every sick person to the King's Sacred hand to be touched. The Clerk of His Majesty's Closet first presents a bit of gold to the King, which he receives from the Keeper of the Closet, upon whose arm the gold medals ready strung are hanging. Prayers are read during the whole of the ceremony and upon the laying of the King's hand upon each person is recited "They shall lay their hands upon the sick and they shall recover." When finished the lord (in waiting) and the vice chamberlain or other two nobles bring to the King

linen and a basin and ewer that he may wash his hands and he then takes leave of the people.

The grandeur of the scene was further heightened by the presence of several divines in full canonicals who stood round the canopy of state. It is easy to imagine the effect of the ceremony on the poor and illiterate people who had often travelled hundreds of miles and had spent weeks upon the journey. The days on which the touchings were to be held were fixed at sittings of the Privy Council and were solemnly notified by the clergy in all the parish churches of the realm. The later Stuart Kings frequently held the audiences in the Banquetting room at Whitehall.

In France the custom did not die out until the year 1776 but in England the Jacobites maintained that the power did not descend to William and Mary or to Queen Anne though as a matter of fact the ceremony was performed repeatedly by these monarchs in spite of the fact that William disbelieved in it and would say after touching, "God give you better health and more sense." Dr. Johnson as everyone knows, was a recipient of the favor at the hands of Queen Anne when he was a child. The Hanoverian Kings of England never touched but it was not until sometime after the accession of George I that the form of prayer special to the occasion was removed from the Prayer Book. Its last appearance is in Basket's folio edition published by the University of Oxford in the year 1715.

The belief, however, lingered on in the minds of the people and within the last fifty years a pilgrimage was made from a distant part of England to Ashburnham in Sussex in the hope of a cure from the touch of a sheet in which the body of King Charles I had been wrapped after his execution.

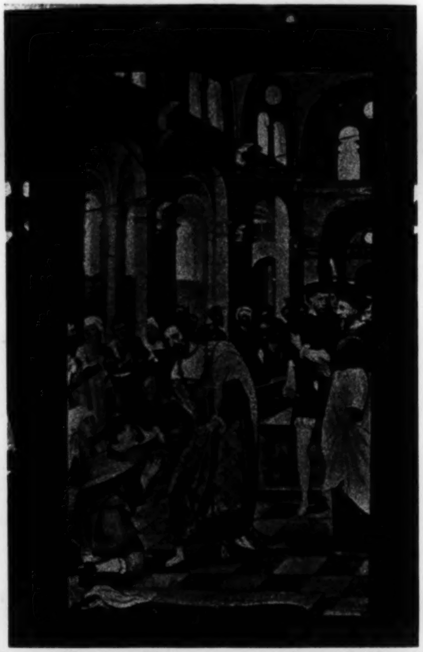
FIG. 2. HENRI II TOUCHANT. 1547. LIVRE D'HEURES 1429. BIB. NAT. FARQUHAR 5.

The sheet with the Martyr's watch is in the possession of the Earl of Ashburnham the lineal descendant of John Ashburnham the friend and faithful servant of the King.

The piece of gold bestowed by the English King or "the Touchpiece" as it was popularly called was considered by the patients to be of so great an importance that the disease recurred if it were lost. The whole subject of "Touchpieces" has been dealt with exhaustively by Miss Helen Farquhar.[1] She shows that at first one penny was given to each suppliant and that this gradually increased until in the reign of Henry VII (1505) a gold coin called an Angel was given. The value of the coin was 6/8 that is to say about a dollar and a half. It was current as a coin, represented the ordinary physician's fee for a consultation and received its name from the fact that the obverse had a figure of St. Michael with wings, engaged in killing a dragon. Of these angels there were at first two varieties. The one bore the legend *Jesus autem transiens per medium illerum ibat;* the other *Per Crucem tuam salva nos, Christe Redemptor.* Miss Farquhar suggests that the one was used as current coin, the other rather as an amulet which could be pierced and worn in battle. The value of the Angel rose to 10/– in the reign of Queen Elizabeth but by the time Charles I came to the throne it was only valued at 7/6 and had ceased to be a current coin so that it was only struck for the ceremonial of touching. The expense even at this reduced value was enormous for in 1660 no less than 6005 persons were touched so that more than 24,000 dollars were given away at a time when money was probably six or seven times more valuable than it is now. When the Stuarts were driven into exile they continued to touch for the King's Evil but as they became poorer and poorer they gave a silver touch-piece at first and afterwards copper.

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[1] *Brit. Numismatic J.*, vols. 12, 13, 14, 15.

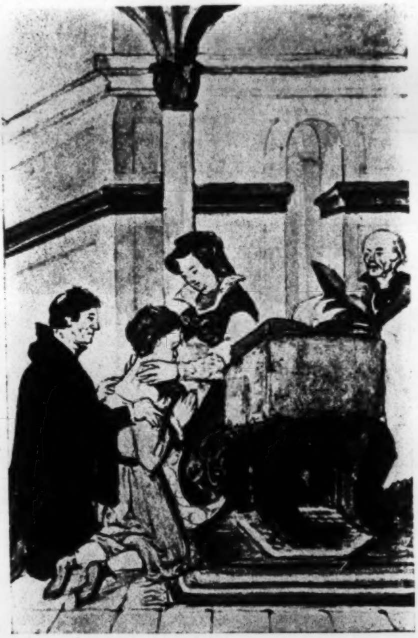

FIG. 3. QUEEN MARY TOUCHING FOR THE EVIL. QUEEN MARY TOUCHES A SCROFULOUS BOY. QUEEN MARY'S MANUAL, LIBRARY OF ROMAN CATHOLIC CATHEDRAL, WESTMISTER. (AFTER CRAWFURD.)

The number of persons applying to be touched became so great about 1670 that the surgeons had to take special measures to limit the numbers. Each applicant had to bring a certificate from the officers of the parish in which he lived. The certificates were examined by one of the King's Surgeons specially detailed for the purpose. The surgeon kept a register and to each suitable applicant he gave an "admission piece" to prevent the same patient presenting himself more than once. The Surgeon-General's Library contains an example of one of these admission pieces. It was made of base metal showing on one side a blessing hand touching one of several heads with the legend "He touched them" and on the other side a crowned rose and thistle with the words "And they were healed."

The reasons assigned for the cure are excellently given by Tom Fuller, the learned author of the "Church History" which was published in 1655. He says:

> But whence this cure proceeds is much controverted amongst the learned. Some recount it amongst the number of the ἀταπόδεικῖκ (the undemonstrable or improved) whose reason can not be demon-

strated. Others impute it to the powers of fancy and an exalted imagination. For when the poor patient (who perchance seldom heard of and never saw a King before) shall behold his royal hand dabbling in a puddle of putrefaction and, with a charitable confidence, rubbing, smoothing, chasing those loathsome kernels (which I may call clouds of corruption dissolved in a feculent shower); I say, when the sick man shall see an hand so humble of an arm so high, such condescension in a King to stroke that sore at which meaner persons would stop their nostrils, shut their eyes or turn away their faces; this raiseth, erecteth, enthroneth the patient's fancy, summoning his spirits to assist nature with their utmost might to encounter the disease with greater advantage. And who will look into the legend of the miracles of the imagination shall find many strange and almost incredible things thereby really effected.

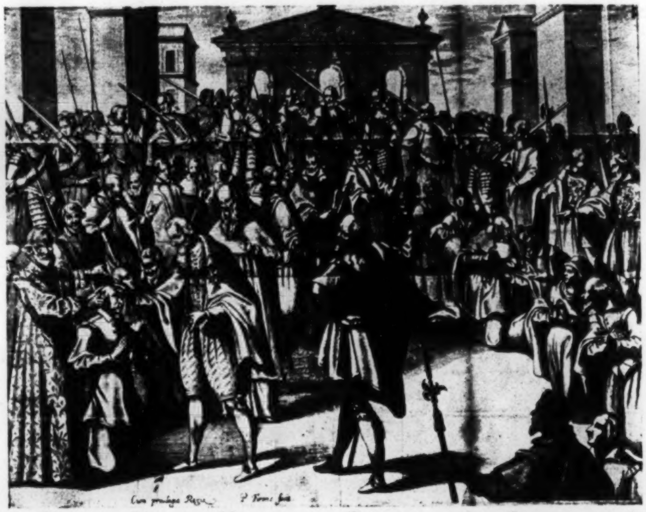

FIG. 4. HENRI OF NAVARRE MURDERED BY RAVAILLAC, 1610. (LAWRENCE, 1609.)

Other men and particularly Gaspar Pencerus, though acquitting this cure from diabolical conjuration, yet tax it as guilty of superstition. With him also such do side as quarrel at the ceremonies and circumstances used at the healing of this malady. Either displeased at the Gospel read (consisting of the first nine verses of the Gospel according to St. John) as wholly improper and nothing relating to the occasion; or unresolved of the efficacy of the gold pendant about the patient's neck (whether partly completing or a bare complement of the cure), or secretly unsatisfied what manner and measure of belief is required (according to the model whereof health is observed to come sooner or later) or openly offended with the sign of the Cross which was used to be made by the royal hands on the place infected. All which exceptions fall to the ground when it shall be avowed that notwithstanding the omission of such ceremonies (as requisite to the solemnity rather than to the substance of the cure) the bare hands of our Kings (without the gloves, as I may term it, of the aforesaid circumstances) have effected the healing of this disease. Nor will it be amiss here to relate a passage which happened in the middest of the reign of Queen Elizabeth after Pope Pius did let fly his excommunication against her. There was a stiff Roman Catholic, as they delight to term themselves, other-

> wise a man well accomplished, and of an ingenuous disposition, who, being cast into prison (I conceive for his religion) was there visited in a high degree with the King's Evil. And having with great pain and expence but no success, long used the advice of physicians, at last humbly addressed himself to the Queen's Majesty by whom, with God's help he was completely cured. And being demanded, What News? I perceive, said he, now at last by plain experience that the excommunication denounced by the Pope against her Majesty is in very deed of none effect, seeing God hath blessed her with so great and miraculous a virtue.

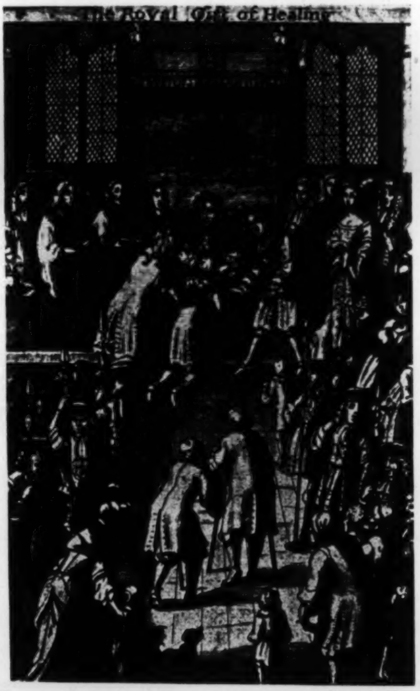
The Royal Gift of Healing

Fig. 5. Charles II Touching for the King's Evil. (John Browne: Adenochoir-adetogia, 1684.)

Fuller was writing during the Commonwealth and under the Puritan rule. It is clear from these passages that he thought what we now call "suggestion" had a great deal to do with the cure. The majority of his generation, however, believed that the cure was miraculous. Personally I side with Fuller, but not wholly, for in the first place I am certain that, at any rate in later years some amount of selection was employed in choosing those who were to be submitted to the Royal Touch. Richard Wiseman who was the King's Surgeon in the reign of Charles II says:

> Those which we presented to His Majesty are chiefly such as have this sort of tumour about the musculus mastoides or neck with whatever circumstances they are accompanied; nor are we difficult in admitting the thick chopped upper lips and eyes affected with a lippitude; in other cases we give our judgement more warily.

We thus see that the cases brought before the reigning monarch were only the slighter forms of tubercle and I have no hesitation in saying that they were just the cases which would now be subjected to open air treatment in a sanatorium. Many of the patients undertook a journey of many days or weeks to reach London and the parish records of places so far afield as the North of Ireland 500 or 600 miles from the Metropolis contain entries of certificates granted to parishioners to the effect that they had the King's Evil and that, as they had not been touched before, they were fit persons for the King to cure. A journey from such remote parts meant travelling for many weeks, partly on foot, partly in wagons when they could get a lift, lying out in the open to sleep and receiving a more generous diet than that to which they had been accustomed. It thus meant a complete change of life for persons who often had not left their native village and had been brought up in a cottage or rather a hovel with a minimum of light and air. It is not surprising, therefore, if so great a change coupled with the suggestion caused by the magnificent ceremonial attending the Royal Touch so increased the bacteriophage properties of the white blood corpuscles as enabled them to fight successfully against a mild tuberculous infection. Perfect cleanliness, too, was enjoined as an advent to the Royal Touch as is shown by a case spoken of by Clowes, surgeon to Queen Elizabeth. He tells of a most miraculous cure healed only by the Queen's most Excellent Majesty when neither Physic nor Chirurgery could prevail.

The Queen cured him safely within the space of six months. And afterwards I did meet with him in London, but I did not well know him, his colour and complexion was so greatly altered and amended. Then I asked him how he did with his grief. He answered I thank God and the Queen of England I am by her Majesty perfectly cured and healed; and after Her Grace had touched me I never applied any medicine at all, but kept it clean with sweet and fresh clean cloths and now and then washed the same with white wine; and thus all my griefs did consume and waste clean away.

THE PHYSICIAN OF THE DANCE OF DEATH*

By ALDRED SCOTT WARTHIN, PH.D., M.D., LL.D.

ANN ARBOR, MICH.

PART V

THE PERIOD OF CARICATURE

IN some of the later imitators of Holbein, particularly Schellenberg, Chodowiecki, and Thomas Bewick, there is a tendency to caricaturize the subjects of the Dance of Death; and this tendency asserted itself predominantly in the first thirty years of the nineteenth century, and especially in England. This was the period in which hand-colored prints had such a vogue in that country. The great majority of these color-prints were aquatints to which the colors were applied by hand. Rowlandson, the most productive, if not the chief artist of this period, usually etched his plates himself, indicating with washes the aquatint tone desired. He would then color a proof from the aquatinted plate to serve as a copy for the colorist. Great numbers of colorists, mostly young women, were employed to color the prints, each one being carefully tinted by hand. As all of the prints of the same subjects were not always tinted by the same hand, great variation naturally occurred in the shades and depth of washes used; and this is an important point to be considered in collecting these prints. Rudolph Ackermann, the noted London publisher, played the chief rôle in the development and encouragement of this medium for purposes of book illustration, and created an enormous business for their production. His "Repository of the Arts," 101, in the Strand, became the chief art center of the period, 1798 to 1830. Ackermann, himself, had a fine artistic taste and discrimination, and chose for his productions the best original artists and skillful reproducers. Of the artists employed by him, Rowlandson was certainly the most active, if not the most brilliant and original. The demand for the Ackermann publications was so great that the publisher had to employ an enormous staff of colorists to satisfy it. Books of every description were illustrated by him with color-prints, and innumerable architectural, sporting and coaching engravings issued from his establishment. Among the most celebrated of these are the "Microcosm of London," 1809, and the "Histories of the Universities," 1814–15. Because of the intrinsic historical interest of these plates, and their decorative value as pictures, an enormous vogue for collecting them has been created. So many of the books have been broken up that the prints might be sold separately that perfect copies have become very rare and expensive. Among the Ackermann publications which had a tremendous contemporary popularity was the semi-moral, semi-caricature species, so dear to the English mind, represented in the "Doctor Syntax," "English Dance of Death," "English Dance of Life," and other series.

"Newton's Dances of Death" were published in July, 1796, by William Holland, of Oxford Street, London.

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* Part I appeared in the July, 1930, issue of the ANNALS OF MEDICAL HISTORY, p. 351; Part II in the September, 1930, issue, p. 453; Part III in the November, 1930, issue, p. 697; Part IV in the January, 1931, issue, p. 75. Part V, here published, concludes the work.

These were engravings on copper by Richard Newton, executed in a grotesque fashion, and intended to be caricatures of the subjects, designed for popular fancy. There were 28 plates, some of the subjects being decidedly vulgar, and in bad taste. They have no artistic value. The Physician enters into two of the plates, Nos. 14 and 16. In the first, the Physician, Grave Digger, and Death are represented dancing a round, the implication of the partnership existing between the trio, of course, being the point of the plate. In the second, the Physician, sick Patient, and Nurse are represented, again with insidious implications as to the profession. Later, Newton issued a set of etchings entitled "Bonaparte's Dance of Death." The exact date is not known. There were six of these plates, the satirical character being shown by the titles: 1, Stabb'd at Malta. 2, Drown'd at Alexandria. 3, Strangled at Cairo. 4, Shot by a Tripoline Gentleman. 5, Devoured by Wild Beasts in the Desert. 6, Alive in Paris. These were also caricatures of no artistic value. Newton's plates must, however, have had a great contemporary popularity, as it is practically impossible to secure a set, so rare have they become.

In 1800, "The Dance of Death Modernized" was designed and published by G. M. Woodward, of Oxford Street, London. It comprised 24 caricatures of poor invention, and badly executed. They represent a low form of wit and humor, and the legends accompanying the plates are particularly insipid. The Physician says: "Here's fine encouragement for the faculty," evidently in resentment at Death's lack of appreciation of the profession's cooperation with the latter.

The "English Dance of Death, from the designs of Thomas Rowlandson, with metrical illustrations by the author of Doctor Syntax," was published in two octavo volumes by Ackermann in 1815–16. The work consisted of seventy-four full-page color-prints, with a poem by William Combe. Rowlandson's clever and humorous spirit found a congenial field in the depiction of these subjects. Many of his plates are very original and curious, and extremely interesting as revealing the morals and manners of the English people in the early nineteenth century. They are all intended to convey a powerful moral lesson, and the artist's efforts in this direction are supported by the poetical text of Combe, which, however, becomes mere drivel in some portions of it. Not all of the plates are equal, either in invention or treatment. Some are irrelevant and ill-chosen; some are feebly treated and devoid of humor. In many the spirit of caricature is carried to such an extreme as to lead simply to the grotesque. The taste of the English people at the time must have been accustomed to strong fare indeed, if they could have been amused or pleased with Rowlandson's over-grotesque depiction of the human body. His art of caricature in this line is an apotheosis of obesity; his men and women are rounded masses of fat, bulging paunches and buttocks, and bulbous bosoms. Many of the physiognomies are hideous, reminding one of exaggerations of some of the grotesque heads of Leonardo Da Vinci. Human beings of the type depicted by Rowlandson must have been very much more common in the England of the first quarter of the nineteenth century than they are today, if Rowlandson is as accurate in the representations of living indi-

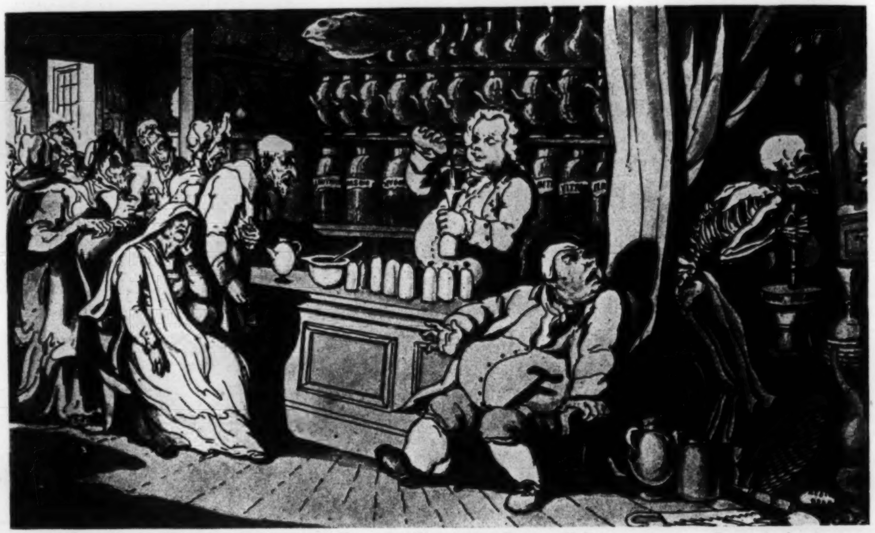


FIG. 56. THE QUACK DOCTOR, FROM THE "ENGLISH DANCE OF DEATH," ROWLANDSON, 1815–16. ACKERMANN.

viduals as he undoubtedly was in his delineation of the English rural background. It is particularly in his representation of the aged that Rowlandson's needle led him into such grotesque exaggerations, for his depictions of young individuals could be both pleasing and attractive. The coloring of his plates is in excellent taste, as is true of all the color-prints produced by Ackermann. The edition must have had a tremendous popularity in England; a copy of it was found in every gentleman's library. Since the War numerous copies have been offered in the trade, but at relatively high prices. It is often sold as a three-volume set, combined with the "English Dance of Life" issued by Ackermann in 1817, with color-prints by Rowlandson and poetical text by Combe. There were twenty-six color-plates, in which the figure of Death does not appear. It was intended as a sequel to the Dance of Death. In 1903, Methuen and Company, of London, printed a facsimile reproduction of the two volumes of "The English Dance of Death," which was limited to fifty copies for Great Britain. The plates are, however, much reduced in size, and the coloring very poorly reproduced.

Four of Rowlandson's plates in the "English Dance of Death" are devoted to the medical profession. The first, No. 11, represents the Quack Doctor. Beneath it is the legend:

> I have a secret Art, to cure
> Each Malady, which men endure.

The plate represents the Doctor's shop in which his quack medicines are compounded (see Fig. 56). Behind the counter stands the Quack, an obese, smug, bewigged individual, engaged in filling bottles with one of his compounds. Behind are shelves filled with jars, bottles, and flasks. From the ceiling a dried fish is suspended. In an armchair before the counter on the left sits an old woman whose expression of misery and illness is particularly well done. Behind her chair, crowd into the shop from the open door a group of as hideous human beings as ever artist depicted, all clamoring for drugs to cure their ills. At the right end of the counter, in a low armchair, is seated a repulsive figure of an obese man who is gazing with horror at the figure of Death, the Quack's assistant, who wields a pestle behind the curtain which partly shuts off the inner office. To his lady customer the Quack advises the use of his remedies:

These *Pills* within your chamber keep,
They are decided friends to sleep.
And, at your meals, instead of wine,
Take this digestive *Anodyne*.
Should you invigoration want,
Employ this fine *Corroborant*.
These curious *Panaceas* will
If well applied, cure every ill.
So take them home; and read the bill,
Which with my signature at top,
Explains the medicines of my shop.
On these you may have firm reliance;
So set the college at defiance.
And should they not your health restore,
You now know where to send for more.

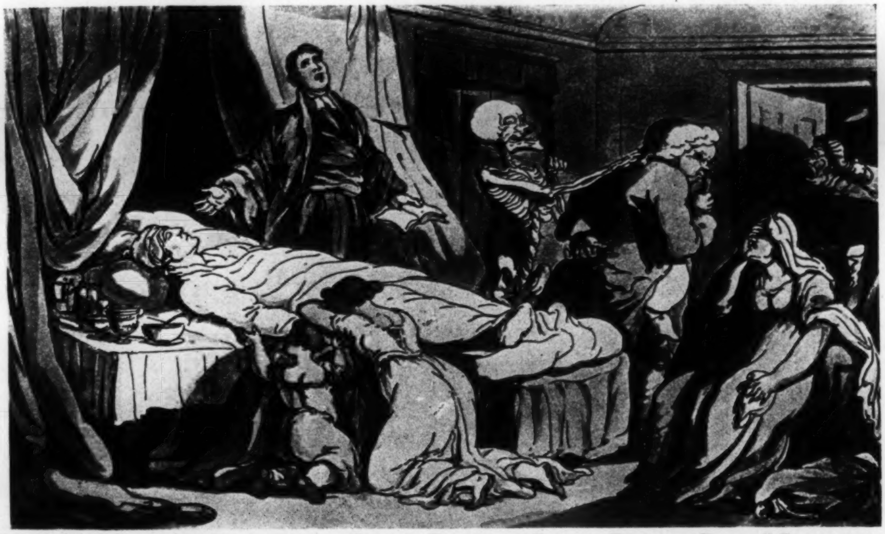


FIG. 57. THE GOOD MAN, DEATH, AND THE DOCTOR. FROM THE "ENGLISH DANCE OF DEATH," ROWLANDSON, 1815–16. PUBLISHED BY ACKERMANN.

Plate No. 15 presents the "Good Man, Death, and the Doctor," with the legend:

No scene so blest in Virtue's Eyes,
As when the Man of Virtue dies.

The scene (see Fig. 57) is a bedchamber with a low bed, on which the dead man of virtue lies. At the foot of the bed are the mourning members of his family. At the side of the head of the bed stands the Vicar in the act of prayer. The Physician, an ugly, obese creature, in the costume of the period, turns his back upon the dead, sniffs the head of his cane, and holds out his hand behind for his fee. Death, with his dart, seizes the doctor by the hair. The text is explanatory:

Thus, as the pious Churchman prayed,
The Doctor in a whisper said,
"My skill in vain its power applies;
"'Tis Fate commands; the patient dies.

"No call requires me now to stay:
"I've something else to do than pray.
"I feel my Fee."—"Then hold it fast,"
said grinning Death,—"for tis your last."
The Doctor heard the dreadful sound;
The Doctor felt the fatal wound,
And hast'ning through the chamber door,
Sunk down, all breathless on the floor,
Ah, never more to rise again.—
Thus Doctors die like other men.

Plate 19 (see Fig. 58) shows the comedy of the life insurance office. It bears the legend:

Insure his Life.—But to your Sorrow,
You'll pay a good, round Sum, tomorrow.

From the accompanying text we learn that the country Squire, by name Ned Freeman, in apparently the best of health, and little over thirty years of age, possessed a wife of good business instinct, and with an eye to her own interest. She reminds her husband of the embarrassed condition of his estate, and that should he die, she would receive from it barely a thousand pounds. She so works upon him, that he decides to insure his life, and up they go to London to accomplish this. We will let the poem tell the remainder of the story:

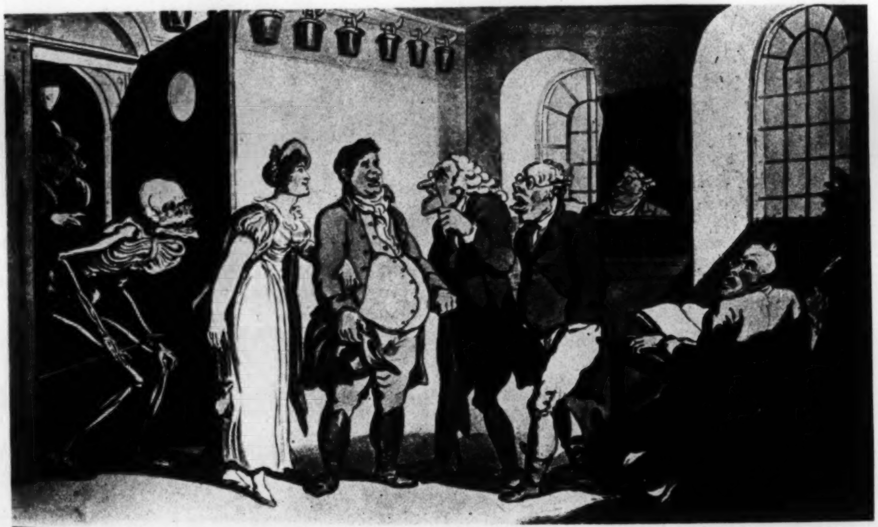


Fig. 58. The Life Insurance Office. From the "English Dance of Death," Rowlandson, 1815–16. Published by Ackermann.

The Doctor's called—his eye to throw
On the good Squire from top to toe.
The sage Director stands beside
In dictatorial pomp and pride,
The important Scrutiny to guide.
—Doctor,—you'll now be pleas'd to scan
The features of that Gentleman;
And tell us, whether that round paunch
Has been nurs'd up by ham and haunch:
Say, if that vast protuberance
Comes from ill habits, or from chance.
Think you that crimson glow is health,
Or formed by drink, or made by stealth.
Those legs, which now appear so stout,
Have they been tickled by the Gout,—
—And, Doctor, for your private ear,
Does not this Country Squire appear
Older, at least, by half a year
Than what he has been pleas'd to state?
—May we trust the Certificate?—
To this the Doctor sage agreed:—
The Office then was duly feed;
And signed and sealed each formal deed.
Now Death, who sometimes loves to wait
At an Insurance Office gate,
To baffle the Accountant's skill
And mock the calculating quill,
Had just prepar'd his cunning dart,

To pierce Ned Freeman's tranquil heart:—
But lest the stroke should cause dispute,
And Lawyer's conjure up a Suit,
Death was determined to delay,
Ned's exit to a future day:
And the dull moment to amuse,
He turned—and killed a pair of Jews.
Thus was the Husband's life insured,
And the Wife's future wealth secur'd.
And e'er, alas, ten days were past,
Honest Ned Freeman breath'd his last,
The Doctor called, to certify,
His glowing health, now saw him die.
Thus she, who lately came to Town,
With not a doit that was her own,
Weeping attends her Husband's hearse,
With many a thousand in her purse;
And proves that she's of Wives the best,
Who knows her *Real Interest*.

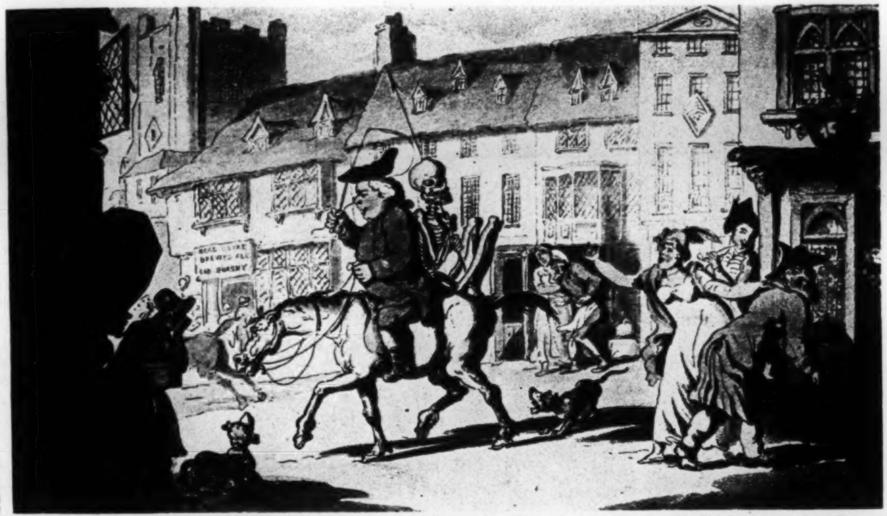


FIG. 59. UNDERTAKER AND QUACK. FROM THE "ENGLISH DANCE OF DEATH," ROWLANDSON, 1815–16. ACKERMANN.

In Plate 23 (see Fig. 59) the partnership of the Undertaker and the Quack is indicated with the legend:

> The Doctor's sick'ning Toil to close,
> "Recipe Coffin," is the Dose.

The undertaker, looking from his window, sees old Nostrum, the quack, riding upon his hack, with Death sitting behind him. As they reached his door, "Death sneezed—and Nostrum was no more." The undertaker bitterly bewailed the loss of his good friend the quack, and was reproved by his wife, saying that the man is dead, and that he has a job. To which the undertaker replied:

You foolish woman, . . .
Old Nostrum, there, stretched on the ground,
was the best friend I ever found.
The good man lies upon his back;
And trade, will now, be very slack.
—How shall we Undertakers thrive
With Doctors who keep folks alive?
You talk of jobs.—I swear 'tis true,—
I'd sooner do the job for you.
We've cause to grieve—say what you will;—
For, when Quacks die,—they cease to kill.

Plate 32, in Volume 2, caricatures a consultation between three doctors (see Fig. 60). It bears the legend:

> When Doctors three, the Labour share,
> No wonder Death attends them there.

From the text it appears that the patient, who had reached the age of fourscore, employed three physicians and a nurse. The doctors came each day, ordering draughts or pills, which, as soon as they had departed, the nurse threw away, and replaced with kitchen physic. This practice at last came to the ears of the doctors, who cursed the bold intrusions of the nurse in doubting their knowledge, and in practicing treason against the College. They complained, and the nurse replied, with the result that a free-for-all fight resulted. In the midst of the rout and riot, Death appears and whispers in the ear of the shocked patient:

> While these strange people disagree,
> You shall receive my *Recipe;*
> Nor feel a pang, nor give a Fee.

The three doctors pictured in this unpleasant scene are all examples of Rowlandson's disgusting big-bellied type, as indeed are all of his physicians. In addition to these illustrations for the "English Dance of Death," he produced a number of single plates and drawings dealing with the Physician and Death. All of these present unpleasant aspects of the practice of medicine, dealing with quackery, the cupidity of the physician, his supposed cooperation with the undertaker, his therapeutic pretensions, and his general coarseness. An unpleasant picture of the medical man of the early nineteenth century is given us in these caricatures. Undoubtedly, many of the English practitioners of the period justified Rowlandson's cruel satire. But it must be remembered that this was the period of Jenner, who represented an entirely different type of physician. Rowlandson applied his satire equally to the follies of both town and country; but in his depiction of beauty in childhood and youth, he won and kept a very high place among the artists of his period. So he must not be judged by his caricatures alone.

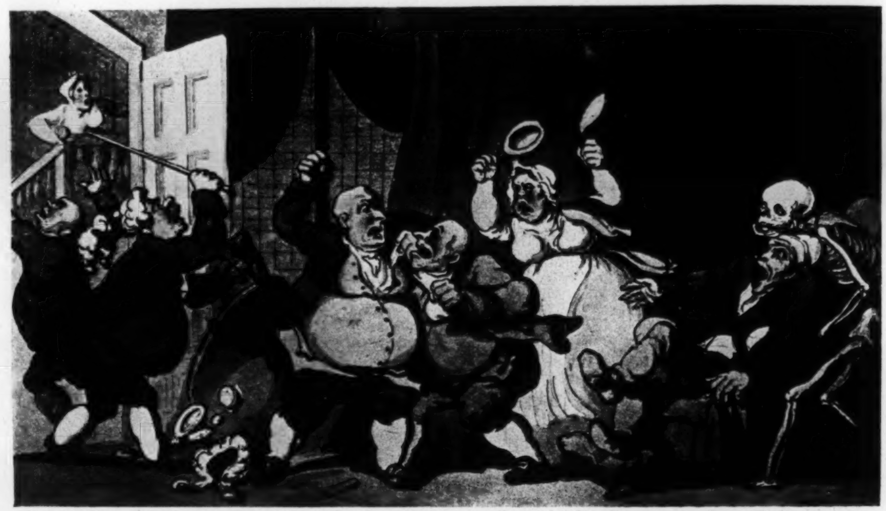


FIG. 60. DOCTORS THREE. FROM THE "ENGLISH DANCE OF DEATH," ROWLANDSON, 1815–16. ACKERMANN.

No doubt stimulated by the great success and popularity of Rowlandson's work, there was published in 1825, by George Smeeton, Pall Mall, London, a series of engravings in color from drawings by Van Assen, with explanatory and moral essays. This bore the title of "The British Dance of Death." In the preface it is stated that the late Mr. Van Assen had no intention of publishing these designs, which are issued in compliance with the wishes of many of his friends to possess them. The editor regards them as "in every respect conducive to the purposes of religion and morality." The frontispiece is signed by Robt. Cruikshank; it represents a sitting Death, crowned, holding a scythe in one hand, and with the other leaning on a globe. Over it are two small compartments containing figures of Death striking an infant in the cradle and a sick man. At the bottom are two figures of Death disposing of a glutton and a drunkard. The preface also states that the work is executed on the plan "of the celebrated designs of Holbein," to which however, it bears not the slightest resemblance. There are eighteen plates, with three subjects only suggesting Holbein, those of the Physician, Miser, and Old Man. The other subjects are new and original, and the treatment is individual. Death, with his dart, stands near the figures, apparently wholly unnoticed by any of them. They are well engraved and tinted, with less delicacy of coloring than in the Ackermann productions. The dresses of the women might well be taken from fashion plates of the time. The humor is rather dull, and the caricaturization

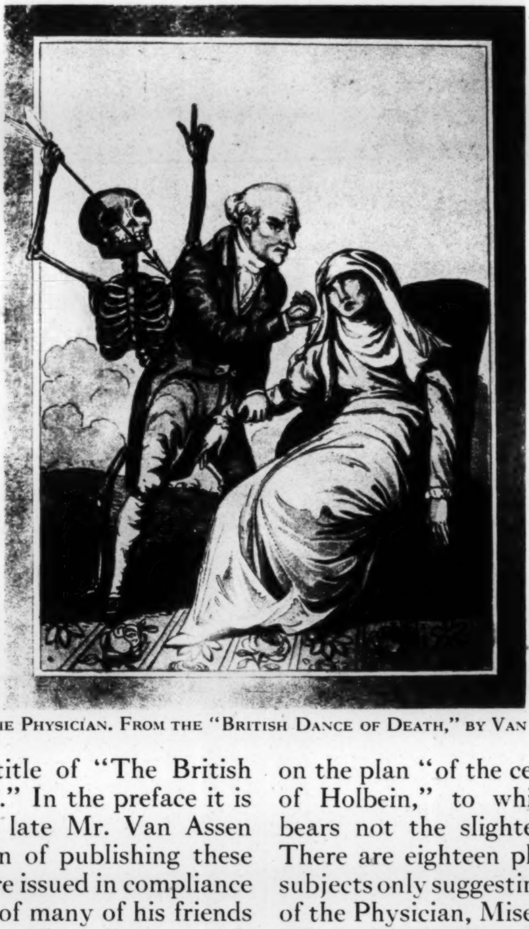


FIG. 61. DEATH AND THE PHYSICIAN. FROM THE "BRITISH DANCE OF DEATH," BY VAN ASSEN, LONDON, 1825.

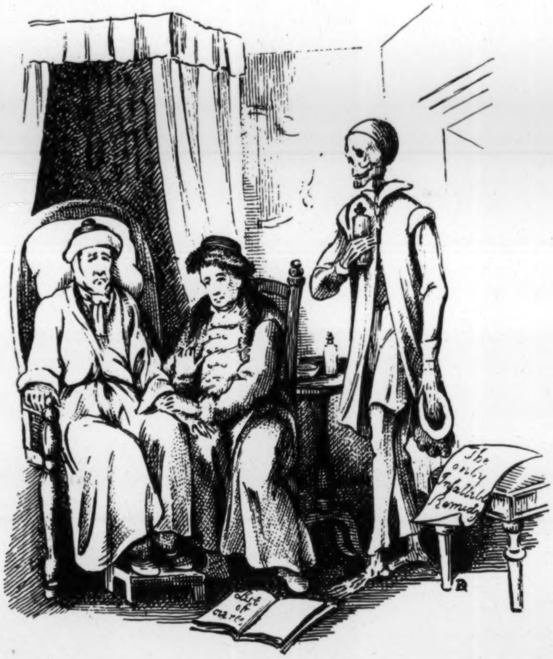


Fig. 62. The Empiric. From "Death's Doings," by R. Dagley, London, 1826.

very mild. In only two of the plates are the obese types of Rowlandson shown. These are "The Glutton" and "The Drunkard." The Physician is a bald-headed, smooth-faced, thin old man with tailed coat and stock. With his left hand he holds the right arm of the patient, apparently feeling the pulse, though not in the right place, while in the palm of his right hand is a large open-face watch. The patient, in an attitude of complete prostration sits in an arm chair. Upon the floor is a green carpet with large red roses, the first appearance of this article of furnishing in prints of this nature. Behind the Physician stands a skeleton Death, aiming his dart at the Physician's back (see Fig. 61). As the satire is better expressed in the accompanying text, we will quote:

Lo! Doctors view of each degree,
Old Galen's sapient progeny,
Those worthy Esculapian danglers,
Men's constitutions dear entanglers;
Whose bushy wigs do first sustain
Great practice, backed by aug'ral cane.
With waste of purse, you may ensure
For galloping Consumption—cure:
By feeling pulse, they will explain
The source of pulmonary pain;
And while right hand embraces wrist,
Behind back glides the other fist;
Ready to grasp those dear definers
Of Wisdom—pretty yellow shiners:
(Tis sage physicians, when in pain)
Send us to mother earth again.
Wherefore great Alexander dying,
Could not refrain from loudly crying,
Stretched on the bed before the Quorum,
"Pereo turbâ Medicorum."

. . . .

Our modern men of this same calling,
Lay consciences beneath tarpauling;
For, with all ills they do their best,

And if they do wrong, soul's at rest.
So whether men live or die,
In each case there's equality.

Gaining one way health's restoration,
By t'other, soul's emancipation;
The one to stomach giving tone,
And strength'ning jaws to pick a bone;
T'other, enabling sprite to fly,
And sing psalms to eternity.
Therefore, whatever be fate's fiat,
Physicians on this head are quiet.

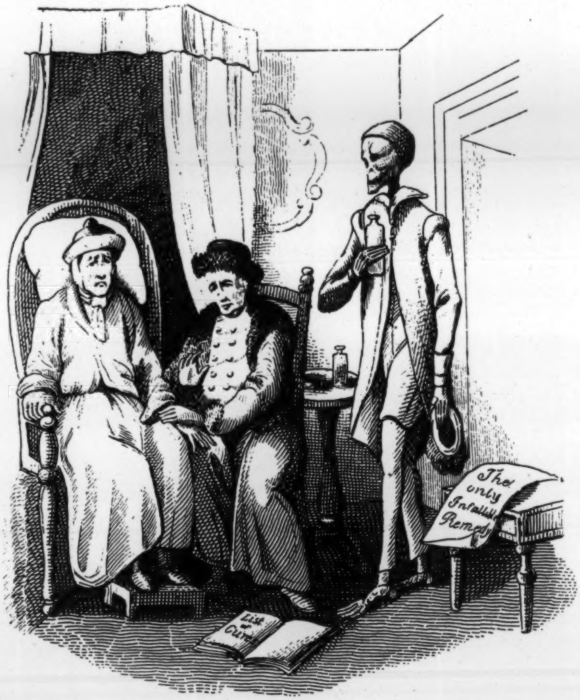


FIG. 63. THE EMPIRIC. FROM THE AMERICAN EDITION OF "DEATH'S DOINGS," BY R. DAGLEY, BOSTON, 1828.

Copies of the British Dance of Death are apparently very rare. They seldom come into the market, and even higher prices are asked for this little volume than for the Rowlandson two. The original issue must have been a limited one. It had board covers, printed with a border of skulls and crossbones, alternating with winged hourglasses. The original price was seven shillings. That these prints were issued separately, in 1822 and 1823, is shown by a set in the writer's possession, each print being dated differently. The coloring scheme is wholly different. They were apparently issued in a serial publication of some kind, but no information concerning it is available.

"Death's Doings," with 24 plates designed and etched by R. Dagley, accompanied by numerous original compositions in prose and verse, contributed by various writers, was published in London, 1826, for J. Andrews and Andrew Cole. Evidently it was issued in a stock form and in one especially printed on better paper, taller, with broad margins, and in a different binding, probably intended to be used as gift books. The copy of the latter, owned by the author is bound in a contemporary cloth of a deep rose color. This work belongs to the species of "Annuals," which were so popular in England during the nineteenth century. It consists of numerous prose and poetical pieces, contributed by various writers, some of whom are anonymous, many of these written in explanation of the accompanying illustration. They are largely sentimental, or pseudo-tragic, and attempt to point a moral. The edition is dedicated to Francis Douce, which may account for the latter's high opinion of it, as he says that it is "enriched with numerous elegant contributions, both in prose and verse, from some of the best writers of the age." Dagley's plates are fair, not very original or inspired, but much less coarse than Rowlandson's. They were much praised by the critics of that day, who described them as "humorous-pathetic," "occasionally tragic and serious, but more frequently in the way of satire and burlesque." They have more of the latter quality than the plates of Van Assen. The Physician represented is the "Empiric" (see Fig. 62). In fur-trimmed hat and cloak he sits feeling the pulse of his patient, who propped up in his armchair, looks the picture of the perfect hypochondriac. Death stands, fully dressed except for his skeleton feet, behind the doctor's chair, holding a stoppered bottle in his right hand. On the floor is a book with "List of Cures" on the open page; on a stool near by is a scroll with the legend, "The Only Infallible Remedy." We repeat here the first stanza of the accompanying poem.

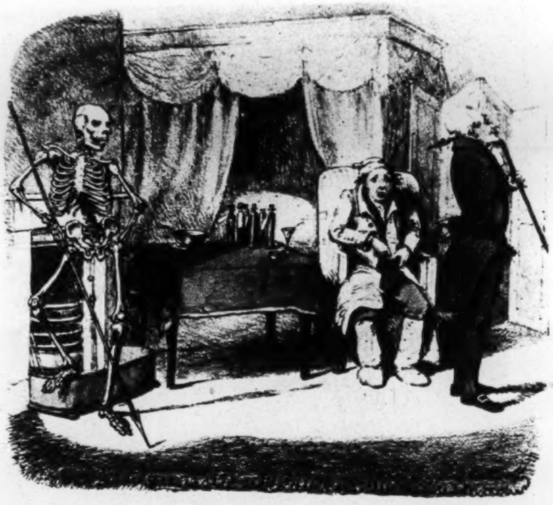

Drawn by Edwd Hull
Printed by C Hullmandel
Death saw a Patient who pulled out his purse,
And a Doctor who took the sum
But he let them be, for he knew the "Fee"
Was a prelude to "Faw" and "Fum"

FIG. 64. THE PHYSICIAN, PATIENT, AND DEATH. FROM A SET OF LITHOGRAPHIC PLATES, ILLUSTRATING THOMAS HOOD'S "DEATH'S RAMBLE." EDWARD HULL, LONDON, 1827.

Quacks! high and low—whate'er your occupation—
I hate ye all!—but, ye remorseless crew,
Who, with your nostrums, thin the population,
A more especial hate I bear tow'rds *you*—
You, who're regardless if you kill or cure,—
Who lives or dies—so that of fees you're sure!

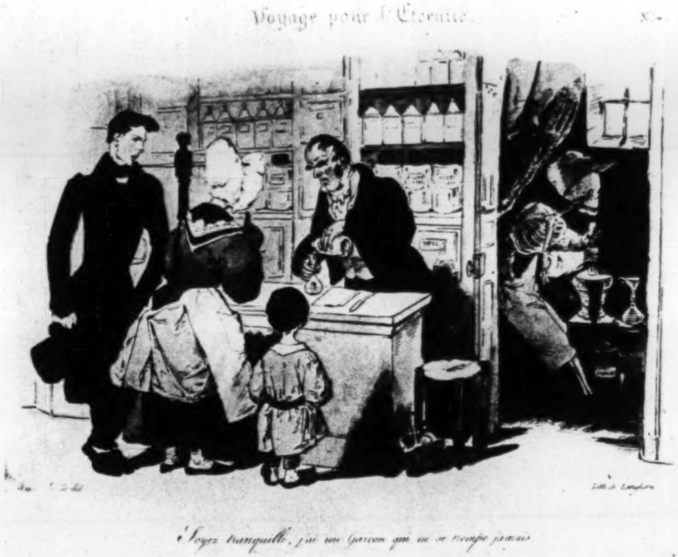

Voyage pour l'Eternité.
Soyez tranquille, j'ai un garçon qui ne se trompe jamais

FIG. 65. DEATH AND THE APOTHECARY. FPOM A SET OF LITHOGRAPHIC PLATES, BY J. GRANDVILLE, "VOYAGE POUR L'ETERNITÉ," 1830.

So great was the popular success of this edition that a new one, greatly enlarged and with additional plates, was brought out the next year, in two volumes. This had thirty plates, and a new frontispiece, designed by Adrian Van Venne, the celebrated Dutch poet and painter. A portion of this edition was colored by hand, after the manner of the Rowlandson plates, perhaps by some of Ackermann's colorists, as the color-washes are more delicate than those used in the Van Assen edition. On the whole, the edition in colors is much more attractive than the uncolored one. In 1828, an American edition of the 1827 two-volume Dagley, was published in Boston by Charles Ewer. It was printed by Dutton and Wentworth of Boston. The type is different, as is the pagination, and the plates show minute differences in facial expressions and shading, indicating that new ones had been made for the American edition, or the old ones slightly altered (see Fig. 63). The plate entitled "The Phaeton" instead of appearing on page 347, as given in the list of illustrations, is used as a frontispiece for the second volume. This American edition is interesting, because it apparently is the second dance of death work published in this country. The author has seen only the two volumes picked up by him many years ago in an old book shop in Boston. There is no mention of this edition in any of the works dealing with the subject.

An edition of six lithographic plates by Edward Hull, illustrating Thomas

Hood's "Death's Ramble" from his "Whims and Oddities," appeared in 1827. This was published in London by C. Hullmandel. The most interesting of these plates is one of a Quaker Meeting House, where Death gives up the Quakers as a bad job, because of his inability to make them suffer. The plate of the Physician is reproduced in Figure 64. The doctor is dressed in pigtail, long-tailed coat, knee-breeches, and buckled pumps. He stands with his back to the patient, holding the head of his cane to his chin in his left hand, while his right with open palm is extended behind him, invitingly to the patient. The latter is reluctantly taking money from his purse, and is apparently engaged in a painful calculation as to how much he should pay. Death, with his dart, stands at the hearth, watching the scene with interest. From the stanza of Hood, below the plate, he evidently decides to leave them alone.

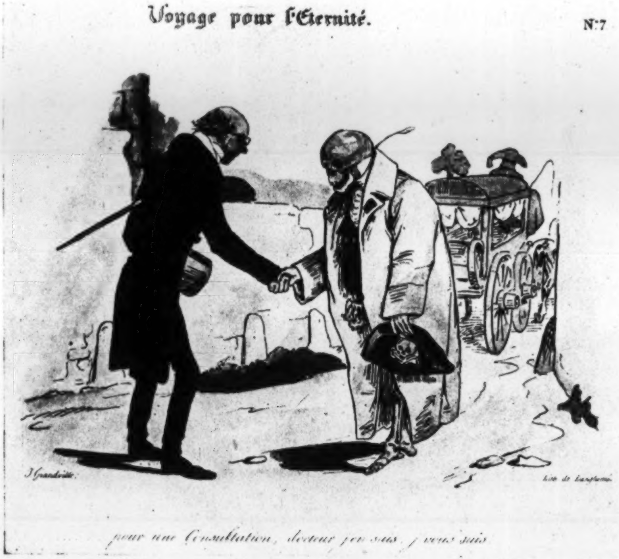


FIG. 66. DEATH AND THE PHYSICIAN. FROM THE LITHOGRAPHIC SET "VOYAGE POUR L'ETERNITÉ," BY J. GRANDVILLE, 1830.

A series of nine lithographic plates by J. Grandville, was issued in an oblong quarto, in 1830, under the title "Voyage pour l'Eternité, service général des omnibus accélérés, depart à tout heure et de tous les point du globe." The frontispiece shows Death conducting passengers in his omnibus to the cemetery of Père la Chaise. Two of the plates deal with the medical profession. Number five presents the Apothecary (see Fig. 65), who is filling a flask for an anxious husband and wife, who, with their little child, stand before his counter. He assures them to be tranquil, for he has an apprentice who never makes a mistake. The latter, seen through the door of the inner shop, proves to be Death wielding the pestle. This plate is undoubtedly imitated from Rowlandson's Apothecary in the English Dance of Death. Plate No. 8 shows Death in the disguise of an undertaker at the cemetery gate, through which the hearse has just entered. He is shaking hands with the old, bald, and spectacled, thin-shanked Doctor, and telling him that for a consultation he is always at his service (see Fig. 66). Grandville was a noted French illustrator of the period, whose animal and flower pictures are of especial interest to us, as it seems not improbable that both Tenniel and Walter Crane drew their inspiration from his work.

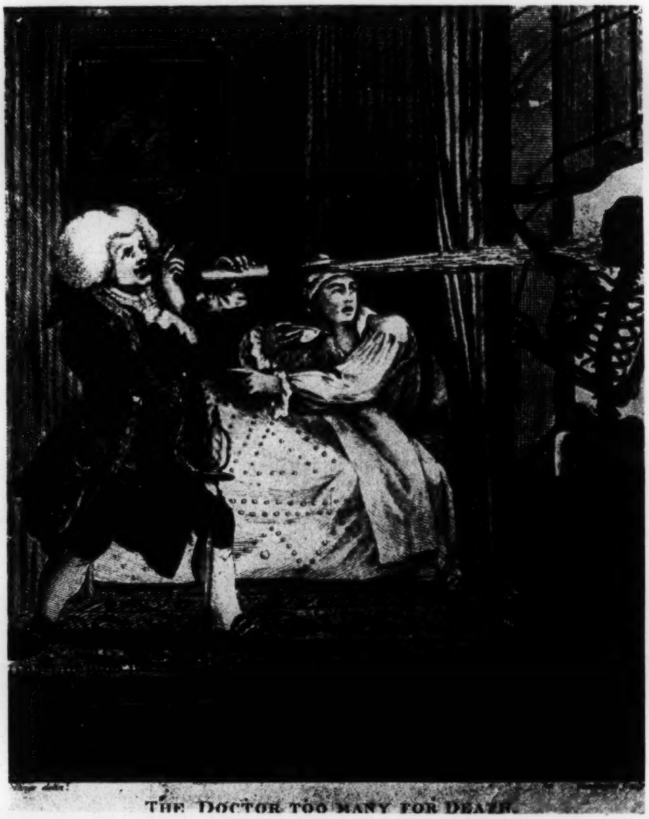

Collings delin
THE DOCTOR TOO MANY FOR DEATH.

FIG. 67. THE DOCTOR TOO MANY FOR DEATH. PRINT DESIGNED BY COLLINGS, EARLY 19TH CENTURY

A Dance of Death for ladies' fans was etched by John Nixon Coleraine, which was published by Fores, Piccadilly, London. No impressions of this have been preserved. It appears to have been humorous and satirical in character. Numerous single prints of the period satirize the Physician or Apothecary. They are mostly of the Rowlandson type, and exhibit no creative ingenuity or artistic value. The majority of them were cheap vulgar prints or broadsides, or cartoons. As an example of such prints, we reproduce a color print designed by Collings, entitled "The Doctor Too Many For Death" in which the

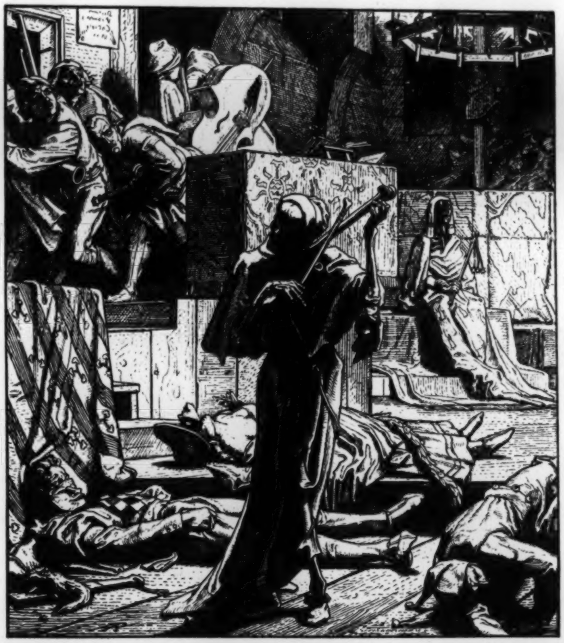
Doctor, most fashionably attired and wearing a sword, turns the tables upon Death by discharging the clyster full in the latter's face (see Fig. 67). The doctor became a favorite object of such ridicule during the first half of the nineteenth century, but this attitude towards the medical profession has now almost passed away, as the science of medicine has asserted its value to the world in the prevention of disease. Even by 1850 the popularity of caricatures of the physician and his partnership with Death had greatly declined; and after this time, prints bearing this character were rarely issued. This change in popular taste may be taken as indicating the growth of an increased respect for the medical practitioner. About 1870 an entirely new type of popular print representing the Doctor began to appear, in the form of sentimental depictions of the Country Practitioner riding at midnight through snow and sleet to answer the call of a country patient; or, one of the most popular, the Physician sitting by the bedside watching the patient, usually a mother or a very ill child. Popular sentiment at last began to be sympathetic toward the practitioner; and to be willing to give him his due.

Part vi

THE MODERN DANCE OF DEATH

The modern period of the Dance of Death evolution may be said to begin with the second half of the nineteenth century. From that time on the art creations that dealt with this theme no longer followed either the medieval model or that of Holbein, but struck out on a new path, that of a sentimental-realistic conception of the subject and of its treatment. Some artists employed the theme for decorative purposes only, so that it lost entirely its old spiritual significance. In these new forms the Dance of Death motive is no longer the expression through art of a universal psychologic experience, but becomes only the means by which an end-effect is produced. With very few exceptions the modern works have no psychologic entity, they are bound together by no unity of thought. In the majority of them each picture stands for itself, wholly unrelated to those that precede or follow. They represent combinations or complexes of incidents, or rather accidents; and most of them point only such a moral as that told by a newspaper account of a similar disaster. The elemental tragic atmosphere of the medieval Dance of Death is lost to this age. As Buchheit puts it, the modern Dance of Death is in short "only the translation of a great mythus into the plebeian diction of a century which has no God." The symbolized world horror expressed in the medieval Dance has become, in the modern exposition of the motive, only the terror of the single individual. This transformation of the motive from a general to an individual application was clearly foreshadowed in the works of Chodowiecki and Schellenberg in the rococo period, and was fully achieved in the compositions of the nineteenth century.

Alfred Rethel is the only artist of the nineteenth century whose art may be mentioned after Holbein's as being really great. By many German art critics he is ranked after Dürer and Holbein. He produced two great works, "Der Tod als Erwürger," und "Der Tod als Freund," which combine the medieval and modern spirit into a harmonious whole of the deepest

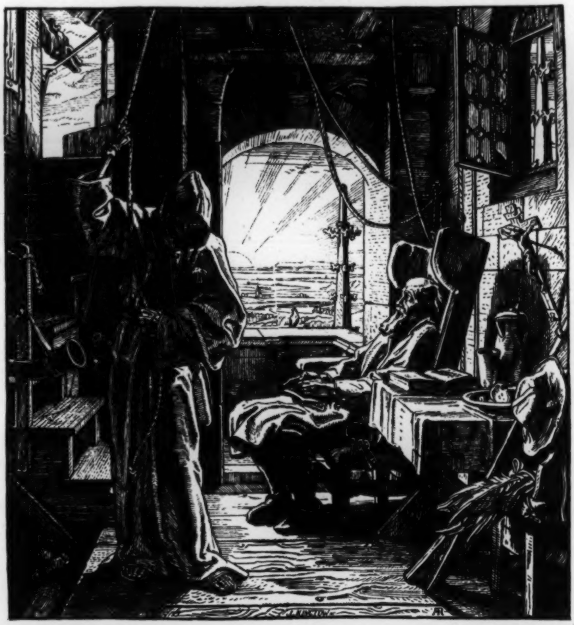


Der Tod als Erwürger.

Erſter Auftritt der Cholera auf einem Maskenball in Paris 1831.

FIG. 68. DER TOD ALS ERWÜRGER. ALFRED RETHEL, 1851.

spiritual significance and impressiveness. His "Auch Ein Todtentanz" inspired by the revolution of 1848, is wholly original in its conception, and expresses with deepest feeling and sympathy the tortured soul of a people in revolt. The six great woodcuts of this series reveal in naked truth the fact that the stirring words, "Liberty, Equality, and Brotherhood" often, if not always, mask deceptively underlying motives of deceit, treachery, madness, and lust of blood. Rethel pulled away the curtain covering the tragedy of revolution, and showed that Death held the center of the stage. Revolution is, indeed, also a Dance of Death. Rethel was essentially a historical painter; he is regarded in Germany as the greatest historical painter of his times. His favorite subjects were Biblical, or were taken from the German sagas, or from Roman history. He possessed a great historical style. His works satisfied the imagination, as they did the intellect. He was more closely related spiritually to Dürer than to any other artist; and in his work the spirit of medieval German art bloomed once again. But only for a short time; Rethel's manhood was unhappy and clouded by mental disease. He died in 1859 at the age of forty-four. In 1851 he produced the woodcut of "Der Tod als Erwürger," inspired by the account by Heine of the appearance of cholera at a masked ball given in Paris in 1831. This might have come from the very hand of Dürer himself, so medieval is its spirit and atmosphere (see Fig. 68). In an ancient hall, decorated for the feast, a masked ball is taking place. Suddenly three of the dancers fall dead upon the floor. The other dancers flee, as do the musicians, in a wild rout. On the throne sits the spirit of pestilence, a mummy figure holding a scourge as a scepter. In the foreground, Death plays a new tune upon the cross-bones. The very apotheosis of sudden death! In its tragic simplicity and power this woodcut makes a tremendous appeal to one's imagination. As powerful, but how different, is the impression made upon one's mind by Rethel's woodcut of "Der Tod als Freund," a later creation, before the shadows of mental disease destroyed forever his creative powers (see Fig. 69). It is the bell-ringer's room in a cathedral tower, surely that of Freiburg in Breisgau, for as one looks through the arched opening, one sees in the distance over the broad valley of the Rhine, the Kaiserstuhl, with the sun setting behind it. A little bird sits on the parapet, and looks in expectantly. The old bell-ringer sits in his armchair, in his last sleep, his keys by his side. It is the hour for vespers. Death in a pilgrim's dress performs for him the friendly service of ringing the vesper bell. It is a beautiful composition. All of the atmosphere of the Middle Ages is in it; but more than that there is the new conception of Death, not as a ruthless destroyer of life, but as a friend, bringing release to the weary



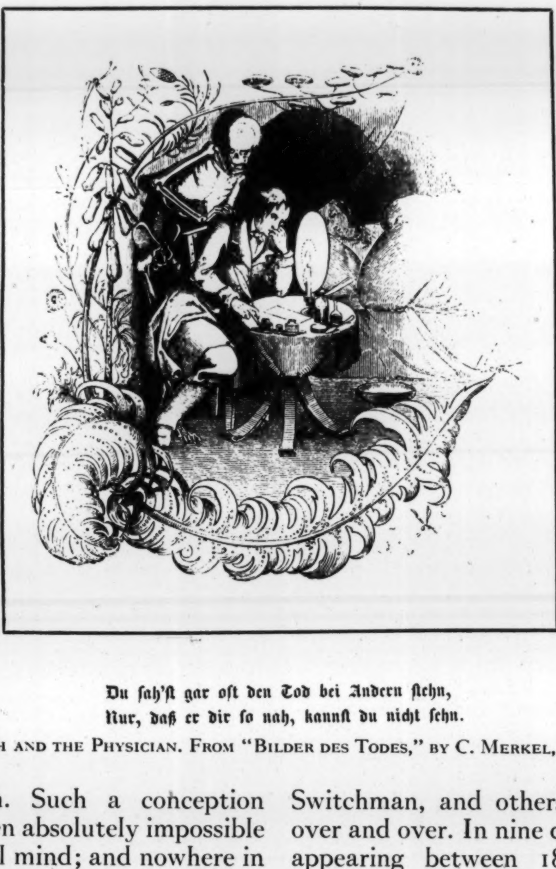
Der Tod als Freund.

Herausgegeben aus der Akademie der Holzſchneidekunſt von H. Bürkner in Dresden.

Erſchienen bei Hermann Michels, Buch- und Kunſtverlag in Düſſeldorf.

FIG. 69. DER TOD ALS FREUND. ALFRED RETHEL, ABOUT 1850.

Arzt.



Du ſah'ſt gar oft den Tod bei Andern ſtehn,
Nur, daß er dir ſo nah, kannſt du nicht ſehn.

FIG. 70. DEATH AND THE PHYSICIAN. FROM "BILDER DES TODES," BY C. MERKEL, LEIPZIG, 1850.

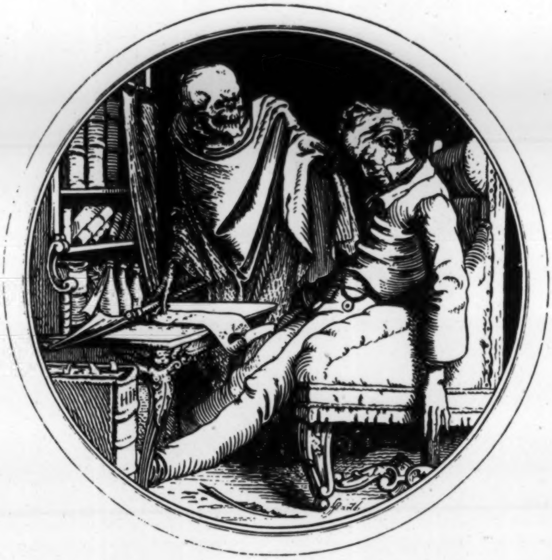
soul. In this work Rethel struck the keynote of the modern outlook upon the world, in its changed attitude towards death. Such a conception would have been absolutely impossible to the medieval mind; and nowhere in the art of the Middle Ages is there anything other than the fear of death portrayed.

After Rethel, the nineteenth century produced no artist comparable to him in creative power or technical skill. The realistic sentimentalists held full sway during the remainder of the century. Their dances of death are simply records of disasters overtaking certain individuals, and there is a monotonous sameness in the individual types presented. The General, The Alpine Climber, the Railway Switchman, and others are repeated over and over. In nine dances of death appearing between 1848 and 1895 the railway accident, with Death acting as the treacherous Switchtender, occurs in every one. Inasmuch as these modern dances no longer portray all classes and ranks of human life, but strive to depict new individuals with new (modern) occupations and professions, the Physician no longer plays a rôle in every dance of death. From many the medical profession is omitted entirely; in others, the Physician is replaced by the Apothecary or the Anatomist. From now on to the end of the story, the Physician gradually disappears from the Dance of Death stage. The farther removed from quackery he becomes, the less interesting he is in art and caricature. Even in those dances of death inspired by the Great War, the Physician makes no appearance at all, in spite of his great service. This is explainable in that the horror of war monopolized all other interests in the minds of the artists producing such dances.

Under the title "Bilder des Todes, oder TodtenTanz für alle Stände," there was issued in Leipzig, in 1850, a series of twenty-four woodcuts designed by C. Merkel. They are of the sentimental type, and have ornamental floral borders. They are wholly uninspired, and remind one of contemporary book-illustrations. The Physician sits at a night table, preparing to write a prescription; the patient, a woman, is seen in bed. Death stands behind the doctor, with his right hand on the latter's shoulder (see Fig. 70). The verses beneath the picture express the old thought that the physician cannot foretell his own death, although able to do so for others. A woodcut series, of eight plates, designed by Ed. Ille, entitled "Die Sieben Todsünden" was published in Stuttgart in 1861. These were of a satirical and humorous nature, and the Physician is not represented. In 1862, twelve woodcuts and vignette by Franz Pocci, "Todtentanz in Bildern and Sprüchen" were issued in Munich. In 1920 this series of woodcuts was reproduced in an edition also published in Munich. These prints are fantastic and decorative. They have a definite charm. Pocci has been classed with Rethel by some German critics. There is no Physician in the series. Pocci was the first to introduce the Alpine climber into the dance of death; and in this was imitated by the majority of those who followed him during the next fifty years. Wilhelm von Kaulbach and Max Klinger, the two most distinguished German artists of the middle and later portions of the century, essayed notable single productions dealing with death, but created no definite series comparable to the Dance of Death form. "Die Arbeit des Todes, ein Todtentanz," by Ferdinand Barth, with twenty-five lithographic plates and title-page, was published in Munich in 1866. Two line verses accompany each plate. There are two plates illustrating the mountain-climber. Few of them show any originality of subject or composition. One of these, appearing for the first and only time in any Dance of Death series known to the writer, represents a death from carbon-monoxide asphyxiation. Death stands by the stove, holding the damper in the stove-pipe tightly closed. The Physician is shown in Figure 71. Death has come to him, as he sits in an easy-chair before his desk, on which lies a prescription signed by Dr. Hein (Death). Death stands by his side, with one hand on the doctor's head, the other holding the prescription unrolled before him. The verses underneath the picture introduce a somewhat new variation of the thought that the physician is unable to help himself. In 1875, "De Moderne Doodendans" by W. H. Kirberger was published in Amsterdam. The plates were lithographs; of their content nothing is known to the author.

About 1885 there appeared in Paris

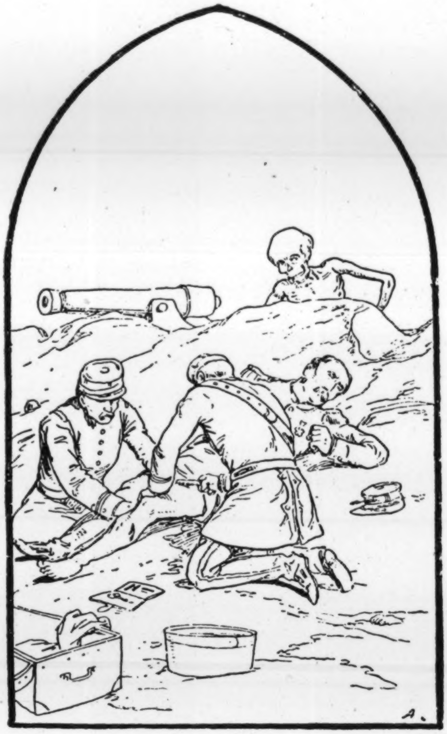
a small volume, undated, entitled "La Pensée de la Mort," by R. P. Ladislas, F. M. Capuchin. It was issued with the approval of the Superior. It contains one hundred and four line-engravings, with a curious mixture of subjects, ancient and modern, the majority belonging to the latter class, however. A few suggest Holbein, the great majority are wholly original in selection and treatment of the subject. While there is a distinct religious flavor, expecially in the legends to the prints, the majority of these deal with secular subjects. For the first time the electric street-car appears as an agent of Death, who acts as the motor-man. Since one of the earliest electric tram-cars was exhibited in Paris in 1881, its introduction into this series speaks for its rapid development as a public utility in that city. Almost every field of human activity is introduced in these prints. Medical subjects are presented a number of times. In Figure 72, the Army-Surgeon is amputating a leg on the field of battle, while Death peers at the group from over the rampart. This is probably a reminiscence of the Franco-Prussian War. For the first time also modern Medical



Haſt viel geſonnen zu jeder Friſt,
Für mich „kein Kraut gewachſen iſt."

FIG. 71. DEATH AND THE PHYSICIAN. FROM "DIE ARBEIT DES TODES," BY FERDINAND BARTH, MUNICH, 1866.

Science appears in the Dance of Death, in the mention of microbes in the speech addressed by Death to the old Physician (see Fig. 73). The Pharmacist and various diseases as "Gangrene," and "Gout" also appear in these curious engravings. In all of them Death appears in skeleton form. In 1891, O. Seitz published in "Kunst für Alle" six small sketches of a Dance of Death, including in these the motives of the "Switchman" and the "General." In the same year Führich published a Todtentanz in large cartoons repeating the same motives. Joseph Sattler, in 1893, exhibited in the Salon of that year "A Modern Dance of Death," which was published by Stargardt of Berlin, with photogravure plates, some of them in color. The subjects are original and well designed, and are wholly in the modern style of the period. Especially striking is the plate entitled "Egalité," which presents in a different form the same thought as that expressed by Rethel. There is no Physician, but one plate has medical



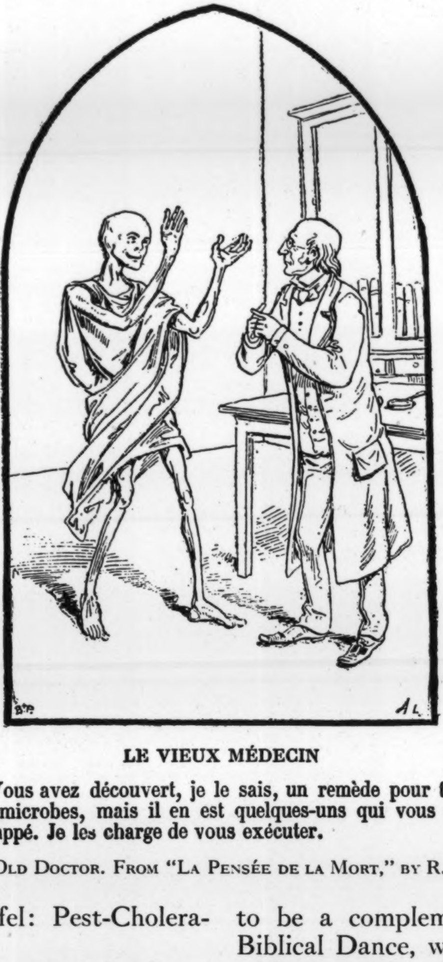
L'AMPUTÉ

Sur un champ de bataille, bien des soins te manquent.
Ne compte pas sur une guérison complète. Tiens-toi prêt
à paraître devant Dieu.

FIG. 72. DEATH AND THE ARMY-SURGEON. THE AMPUTATION. FROM "LA PENSÉE DE LA MORT," BY R. P. LADISLAS, PARIS, 1885.

interest. It represents three skulls, with dice numerals on each, issuing from a [dice-thrower, with the legend "Drei Würfel: Pest-Cholera-Typhus."

In the same year, 1893, Professor Tobias Weiss published in Munich, "Ein Moderner Totentanz" with twenty-three plates from the "Bilderbuch des Todes." Weiss was the artist of the "Sceptra Mortis," a Biblical Dance of Death painted in 1885, on the walls of the Chapel of St. Michael in Mergentheim, copies of the cartoon for which were issued in book form in 1885, and went through several editions. Weiss intended his Modern Dance of Death to be a complemental work to his Biblical Dance, with subjects chosen with especial reference to modern conditions of life. He acknowledges that his representation of the Blindman was suggested by Holbein, that of the Barricade by Rethel, and that of the Sweeper by Führich. Text and poems were written by Kreiten. This work passed through numerous editions up to 1899. For the first time the automobile and the airship

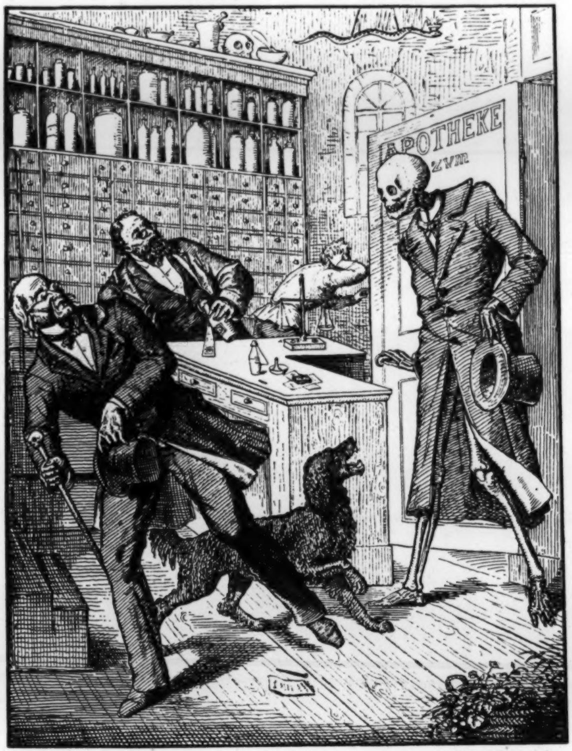


LE VIEUX MÉDECIN

Vous avez découvert, je le sais, un remède pour tuer les microbes, mais il en est quelques-uns qui vous ont échappé. Je les charge de vous exécuter.

FIG. 73. DEATH AND THE OLD DOCTOR. FROM "LA PENSÉE DE LA MORT," BY R. P. LADISLAS, PARIS, 1885.

appear as instruments of death. There are two plates of medical interest, one showing the entrance of Death into the Apothecary's shop where two physicians are having their prescriptions filled (see Fig. 74); the other shows Death driving a cart piled high with coffins and corpses, with a sign bearing the word Cholera. Weiss certainly had no artistic imagination or creative genius; his subjects and compositions are truly plebeian and commonplace. His technical ability is, however, very good. Even in his secular Totentanz he shows his strong religious didactic tendency in the very sentimental picture of the missionary's death in Africa. Much more important than his "Moderner Totentanz" were his frescoes in St. Michael's chapel in Mergentheim, in which in fifteen scenes he pictured the history of the scepter of death from Adam's Fall to the resurrection of Christ with his victory over death. The thirteenth scene, that of the



E. Weiß inv. B. Kühlen. M.Gladbach. reprod.

Ihr Herren, warum eilt ihr davon?
An manchem Lager wir trafen uns ſchon.
Schlecht wahrlich eurer Kunſt ihr traut
Ihr wißt, für den Tod gibt es kein Kraut.

FIG. 74. DEATH IN THE APOTHECARY'S SHOP. FROM "EIN MODERNER TOTENTANZ,' BY TOBIAS WEISS, MUNICH, 1893.

Crucifixion, with its crowd of jeering skeleton Deaths, is imaginative and the most impressive of the series.

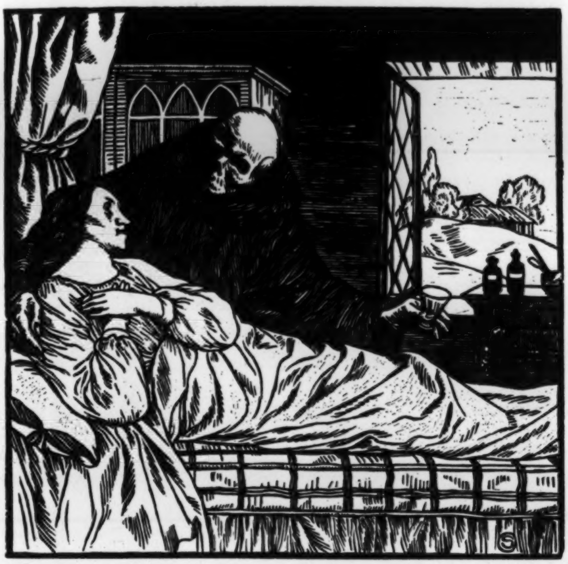


FIG. 75. DEATH THE LEECH. FROM THE "DOINGS OF DEATH," BY WILLIAM STRANG, LONDON, 1901.

A Totentanz in thirteen plates by Karl Steiger was issued in 1894, under the title of "Des Todes Ernte." This was again based upon disasters to the individual through various agents of Death, including the old motives of the Switchtender, the General, and the Mountain-climber. The author has been unable to obtain a copy of this work, so does not know whether the Physician was included. In 1901, twelve large lithographic plates entitled "The Doings of Death," by William Strang, were issued by the Essex Press of London. In this series Strang has given us an entirely new and modern conception of the Dance of Death motive. Death is presented in an entirely new rôle, that of the Comforter, the Lover, and the Mourner. In one plate only, that of the Robber, does this strangely altered figure of Death assert his old cruel power. In all of the others Death is presented in a softened and chastened form, a gentle sorrowing spirit. Gone is the old malicious leering demonic Death of the Middle Ages. Gone is the old horror of Death. We have here in the place of the old implacable enemy of mankind, a reluctant spirit accomplishing his necessary duty in sorrow and sympathy for those about to die, and aiding their departure with gentleness and comforting hands. In the plate "Death and the Children" even his skeleton form is concealed, as he gathers the children with tenderness into his arms. He comforts the dying beggar by the roadside; he throws a coat over the old husbandman as the chill of death strikes through him; he walks by the side of the bier with bowed head and veiled face; with sorrow he calls the artist as Fame approaches with the laurel wreath.

But in the plate of "Death the Leech" is this new interpretation of the meaning of death brought out with fullest force (see Fig. 75). The dying patient, a woman, lies on her bed with hands crossed. Death in the robes of a monk, lets her head fall back gently on the pillow. In his left hand he holds the empty glass from which he has just given her a soothing potion. Through an open window is seen a rural landscape. On the dresser in front of the window are medicine bottles. This quiet picture of the last hour of the patient attended by Ministering Death as the comforting and solicitous physician is impressive, and significant of the change that had come over man's attitude towards death in the latter decades of the last century. And this changed psychology was well-nigh universal in the so-called Christian countries. One wonders in how many funeral sermons of this period, and on how many gravestones occurred the words "He giveth his beloved sleep." To many, if not the majority, of the modern world, Death had come to mean a release from pain and disability, a rest for the weary. This motive is repeated over and over again in both the secular and religious literature of the latter half of the nineteenth century.

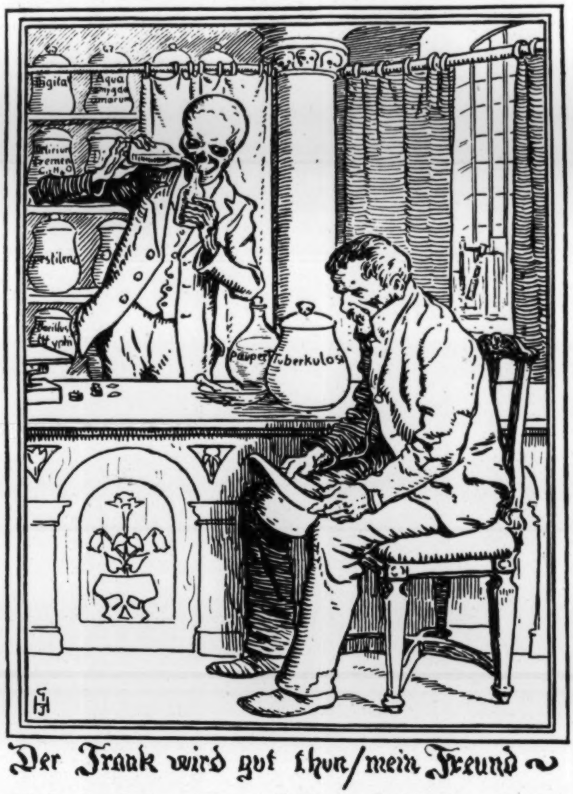
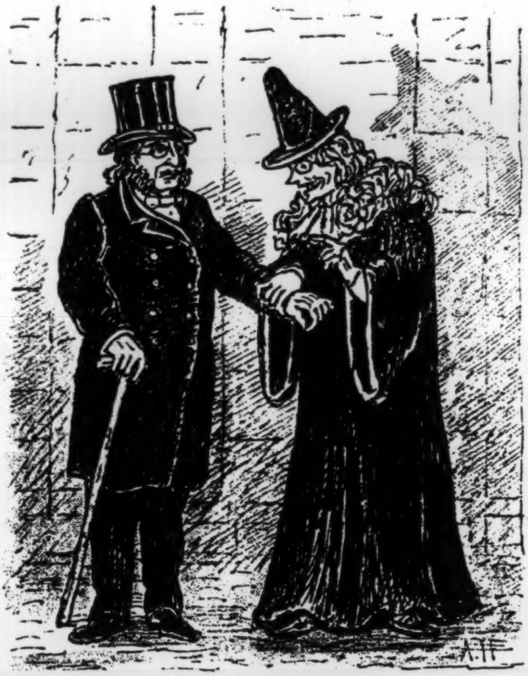

Pestilenz
Tuberkulos
Der Trank wird gut thun/mein Freund

FIG. 76. DEATH THE APOTHECARY. FROM "EIN NEUER TOTENTANZ," BY HANS JENTZSCH, STUTTGART, 1904.

"Lasst euch sagen, lasst euch singen, wie der
Tod ist!
Der Tod ist sanft. Schön is der Tod!
Habt ihr Angst vor ihm? Er ist genau so schön
wie das Leben!
Er ist Leben."



La Mort et le Médecin.

Cher médecin, tu mis ta gloire
A vouloir lutter contre moi ;
Je guéris beaucoup mieux que toi ;
A moi restera la victoire.

FIG. 77. LA MORT ET LE MÉDECIN. FROM "NOUVELLE DANSE MACABRE," BY AUGUSTE HOYAU, CHARTRES, 1904.

To the believers in Christian doctrines Death meant only a rebirth into immortal life. To those who did not accept these, Death was also shorn of his terrors, in that the end of life was regarded as a natural and normal process, to be met with fortitude and reason.

"Ein neuer Totentanz," with eighteen plates, by Hans Jentzsch, was published in Stuttgart in 1904. They are neither very decorative nor original. Old motives, such as the mountain-climber appear again. The progress of modern medical science is shown in the plate of the Apothecary (see Fig. 76). Before the counter sits a haggard ill man. On the counter are two large jars, one labelled poverty, the other tuberculosis. On the shelves one reads such labels as pestilence, delirium tremens, bacillus of typhoid fever, etc. Death, behind the counter, leers at the patient as he fills his bottle with some one of his dangerous wares. The growing importance of the druggist in this period is shown by the predominance of plates representing him over those of the physician. In Jentzsch's plate a double meaning is probably intended. In the dealing out and dispensing of quack medicines advertised to cure tuberculosis and other ills, Death only is dispensed. In the same year a "Nouvelle Danse Macabre" with designs and poetic quatrains by Auguste Hoyau was published in Chartres. It is a half-satirical, half-humorous production of no originality or artistic value. Many of the plates are evidently meant to be caricatures. In some of the pictures Death is represented in the form of a female skeleton. The plate of the Physician is reproduced in Figure 77. Death in a conjurer's hat and gown holds the physician's left wrist feeling his pulse, and addresses him in the words of the legend given beneath the picture. It is interesting to note that, aside from the early wall-paintings of the Danse Macabre, France has never produced a Dance of Death that had any artistic value whatever.

"Ein Totentanz," by Hans Meyer, with thirty plates, was published in Berlin in 1911. In his preface Meyer expresses his modern attitude toward Death, when he says: "Seldom will Death be welcomed when he knocks at the door; but he comes also sometimes at one's call, earnestly desired and longed for. Thoughts of death have nothing fearful in them, to those earnest souls who have lived a long, not wholly wasted life." Meyer's plates are typical of the German art of his period, sentimental-realistic, and technically well done, in a style that would now be regarded as antiquated. Most of the subjects are old ones; the blind man, the switch tender, the bicyclist, the airship, the miser, etc., again appear in different modes of treatment. There is no plate of the Physician or Apothecary; instead of these, the fountain of Hygeia. Death, kneeling before the fountain, distributes its waters to the crowd of health seekers about him, with the invitation, "Du willst dir Leben trinken? Komm her! Ich schenke ein" (see Fig. 78). The meaning evidently is, that he who drinks the cup given by Death finds everlasting life.

And then came the cataclysm! The Great War! And the medieval horror of Death returned to a people that had lost it. It came with stunning force. Death in a thousand new forms of poison-gas, liquid fire, air-raids, torpedo, submarine, and others, even more horrible! In the shell-torn desolate plain of the battlefield, in the foul mud of the trenches, behind the barbed wire entanglements, the old medieval specter waited for its victims, the youth of the nations. A striking drawing by Jean Veber, in 1918, shows us a young stripling, helmeted, with his feet sunk in the mire of the trench, and holding a hand grenade, staring into the face of Death, who has crept beneath the barbed wire and hangs his head over the edge of the trench leering at the young soldier with a cruel ghastly grin. In the boy's face is an expression of paralyzing fear. This drawing is signed "La Glorie." On the head of Death is a wreath of laurel leaves. It is a tragic representation of the way Death came to thousands and thousands of young men in the trenches. Is it any wonder that many minds cracked under the strain of such experiences and gave way; and that those who lived through such came out of the war emotionally burned out? Nor was it at all strange that the friends and relatives at home should turn again to the promises of medieval religion, or to the false consolations of mediumistic spiritism! With such emotional instability as characterized the thirteenth and fourteenth centuries was the modern psyche transformed. No wonder then that the Dance of Death motive received new life. Throughout the whole world, in newspapers, journals, and magazines, appeared cartoons with the representation of Death. Raemaecker's cartoons are among the most noted of these. They appeared in numerous editions in Antwerp, Amsterdam, London, and New York. While of deep political significance, they nevertheless expressed the horrors of modern warfare in a most realistic manner. In these great picture-books of the war, the medical profession goes unnoticed. Disease is mentioned, but not the preventer of disease. And this is true of all of the Dances of Death that were produced during the war and immediately after it. In 1919 a collection of twenty woodcuts by Herman Paul under the title of "La Danse Macabre" was published in Paris. This has nothing at all to do with the war. The subjects are grotesque, and have little originality or artistic value. The woodcuts are coarsely executed.

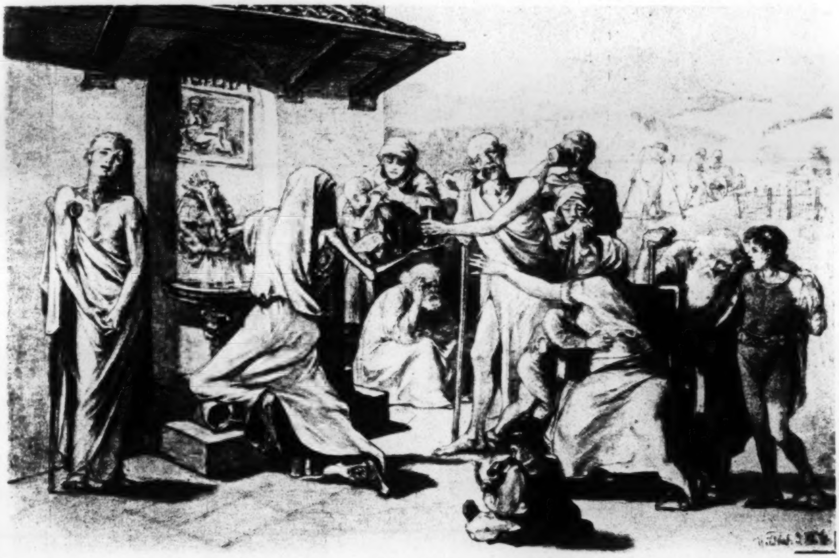


Fig. 78. Death at the Fountain of Hygeia. From "Ein Totentanz," by Hans Meyer, Berlin, 1911.

A "Totentanz, 1914–1918" with poem by Carl Wiegand was published in Zurich, undated. It is illustrated with eleven lithographs by Hanz Witzig. Some of these are strikingly original and imaginative. The bayonet charge in the trenches, over which towers a giant figure of Death beating a drum; the army of naked young men on horses, halting on the bank of a little river, illumined by exploding shells, with an enormous skull rising out of the water, opening wide its cavernous mouth to engulf them; and the cemetery of the battlefield, with its multitude of crosses, and Death, the gravedigger, in his shirt-sleeves, leaning on his spade: these are among the best. In one plate, Death appears as the Comforter, reminding us strongly of Strang's similar presentation of Death the Leech. It is the deserted battlefield by moonlight. In the barbed-wire entanglement a young naked boy is lying. Death in a monastic hood and robe lifts the boy's head and holds to his mouth a canteen. "XIII Danses Macabres," by Paul Vaillant-Couturier, and fourteen designs by Jean d'Espourg, dated Paris, 1920, present more realistic and less imaginative pictures of the war. Individuals and individual groups of soldiers are presented, more as studies of types, than with deep psychologic significance. There are two representations of dead soldiers caught in the barbed wire. The technic is of the type known as modern; the plates have no beauty, and lacking imagination, affect one unpleasantly. In the same year, Edmond Bille produced "Une Danse Macabre," with twenty engravings in color, published at Lausanne. This the writer has not seen. "In Flandern reit't der Tod," a dance of death by Erich Glas, in five woodcuts with colors, appeared about the same time, but is also unknown to the writer.

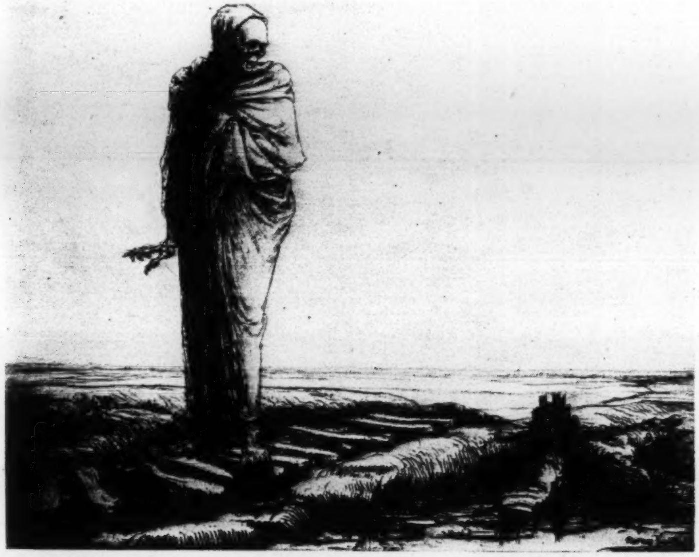


FIG. 79. DEATH AWED. FROM "THE DANCE OF DEATH, 1914-1918." BY PERCY SMITH, 1919.

The most inspired of the works influenced by the Great War is the "The Dance of Death 1914–1918," in seven etchings by Percy Smith. It is dated 1919. These are dignified, original, imaginative compositions, entitled "Death Forbids; Death Marches; Death Awed; Death Refuses; Death Waits; Death Ponders; Death Intoxicated." In these terribly realistic but spiritually deeply significant plates the horror of modern warfare is shown as in no other art of the times. In the first plate Death holds out a restraining hand to the soldier caught in the barbed wire beneath a shell-torn fallen tree; in the second, Death watches the march to the front of the young helmeted soldiers. The third plate is reproduced here (see Fig. 79). The shrouded figure of Death stands alone on the abandoned, trench-scarred battle field. He gazes with shocked face and uplifted hand at a pair of boots from which project the broken leg bones. In the fourth plate Death turns his back upon the tortured gassed soldiers in the dugout, begging for relief. The fifth plate is one of the most impressive of all; Death sits with chin on hands, waiting, behind the barbed wire. In the next plate, Death watches a wounded soldier attempting to crawl out of a shell hole. The final picture shows Death dancing madly, glutted with blood lust, as the wild bayonet charge goes on. This set of etchings is the one art work of the War period that in any degree can be said to rank in importance with the works of Holbein and Rethel. They tell their story of the Great Horror in the same direct realistic manner, but nevertheless, transformed by the magic of imagination into universal symbols.

In 1922, "Ein Totentanz," by Walter Draesner, with text by Max von Boehm, was issued in Berlin. This represents a new technic, that of silhouettes cut from black paper. These pictures are remarkably effective; they possess style and power of expression. His forms are living. The majority of the subjects are secular, very few are inspired by the war. In this work there is a return to the motives of the Totentänze of the imitators of Holbein. Old subjects reappear, such as the mountain-climber. One of the most tragic is that of the young woman being burned at the stake. It could be Joan d'Arc. We reproduce here the picture of the Anatomist strangled by one of his own skeletons. This is the last appearance of the Medical Profession in the modern dance of death (see Fig. 80). The expression on the skeleton's face as he throttles the old Professor of Anatomy is that of tense and determined cruelty. It is remarkable that such an expression could be achieved by so simple a medium. Draesner is certainly extremely clever in his new technic, even if we are reluctant to look upon it as capable of the highest artistic expression. In 1923, a work entitled "Gestalten Des Todes, Ein Totentanz des Weltkriegs," by Melchior Grossek was published by Kurt Schroeder of Bonn and Leipzig. This is also in silhouette style, with the use of color in some of the plates. The work was dedicated to the two brothers of the artist who fell in the War. Originally planned as a Cycle in Three Parts, only the first part has ever been issued. This is the most imaginative and original German Totentanz inspired by the Great War. There are fifteen plates, each one of which represents some phase of the great conflict. The long-range gun, the marching German Host, the German Field Marshal, the battle, Zeppelin, airplane, and mine are all presented here in most original and effective manner. Great imagination and decorative taste are shown by the artist, and the black figures upon the light background produce the effect of a shadow play. The figure of Death in all of the plates is presented in the form of a gigantic and grotesque skeleton, anatomically exaggerated for purpose of effect. The last plate, with the legend "Kampfpause" shows us Death sharpening his dull and broken-edged scythe in preparation for the next war.

Some time, early in the twenties, "Ein Totentanz" by Alfred Kubin, was published in Berlin. It is undated. Although not directly inspired by the War, several plates show its influence, as the helmeted Death and the sinking ship. Others show Holbein or a medieval influence in the subjects chosen. The technic is that of coarse pen-and-ink drawings. The plates are grotesque, not especially original or imaginative, and the series is not a very notable contribution to the Dance of Death. The last published Dance of Death of which the author has knowledge is "Ein Anatomischer Totentanz" by Albert Haszelwander, issued in Munich in 1926. In this work, the living body is contrasted with the skeleton, both posed in exactly the same manner. While designed primarily for anatomists and artists, these reproductions must have an interest for any one who has a knowledge of the mechanism of the human body, or an appreciation of its beauty of action. It is not properly a dance of death, but is only a series of anatomical actions and postures represented in the living body and in the skeleton. It has no significance connected with death.

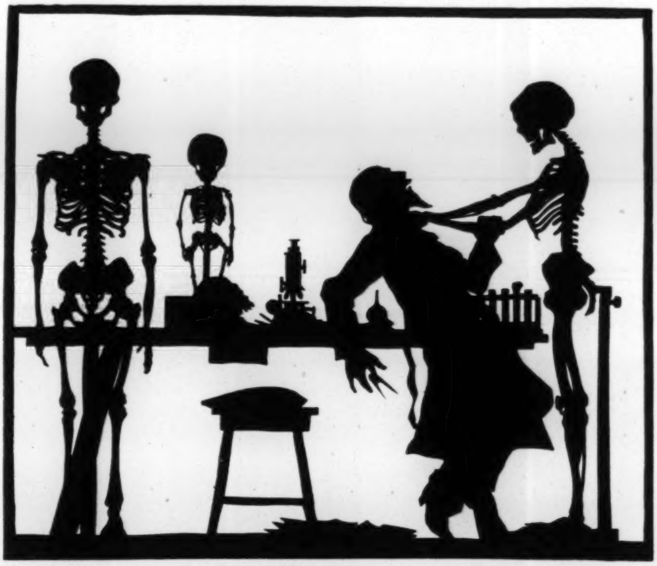


FIG. 80. DEATH AND THE ANATOMIST. FROM "EIN TOTENTANZ," BY WALTER DRAESNER, BERLIN, 1922.

So ends our study of the Physician of the Dance of Death, in a very marked decrescendo of importance as far as his position in the Modern Dance is concerned. During the first quarter of the twentieth century the Physician has stepped out of the picture. The reasons for this may be found in the changed attitude of modern times toward the man of medicine, and also toward the Dance of Death motive itself. In the Medieval Totentanz the Physician presented a definite type especially adapted to the satire of the old religious-didactic motive of the Dance. After the secularization of the motive by Holbein, he still retained a position of importance in its representations, in that the elements of quackery invested in him were exaggerated for the purpose of satire and caricature. The tendency of the modern works to replace the Physician by the Apothecary shows a transference of the quality of importance from the doctor himself to his prescriptions. Not the physician, but the science of medicine assumed the responsibility for the failure of drugs to cure. The helplessness of medicine, not the pretension and dishonesty of quackery, came to be realized, and this theme is reflected in some of the modern dances of death. That the Physician had no place in the Dances created by the World War is wholly explainable by the complete change in motive. Their object was to present the horrors of modern warfare, and in these the Physician had no part. Types of individuals had no rôle in them; they were created for the express purpose of presenting Death, tremendous, horrible, and inevitable, himself intoxicated by the wild orgy of slaughter. On the other hand a new version of the Dance of Death motive might have been produced out of the emotions roused by the War, which would picture the conflict waged between Death and Medicine. In this the hero would be the Physician, the war-hospital the scene, and the actors opposed to Death would be the Army Surgeon and Physician, the Nurse, the Ambulance Driver, the Laboratory Worker, and even the Medical Orderly. Out of this theme surely some inspired artist could create a Dance of Death that would serve as a memorial of the important part played by medicine in the great catastrophe. As long as the human race persists, Death, the end of all, will still be to the individual the event of deepest concern and interest. Not necessarily a morbid interest: Death can be conceived as a natural and physiologic process, necessary in the scheme of existence. It can be accepted as such, and happy is the man who can do so. The Dance of Death idea is as immortal as the life of the race; but in each new period of human thought it will express itself in new form corresponding to the predominant philosophy of that time. From the primitive wall-paintings of the Middle Ages as marking the period of religious superstition, to the intellectual creation of Holbein as characterizing the Renaissance, and following this the gradual decrescendo through the Rococo period to modern times, the Dance of Death motive has followed a definite evolution which now awaits the artist of the modern period, who will express adequately in some art form the changed philosophy of the twentieth century toward Death. The Totentanz mythus awaits a new birth.

MAX JOHANN SIGISMUND SCHULTZE*

[1825–1874]

By THEODORE H. BAST, PH.D.

MADISON, WISCONSIN

IN the history of the biological sciences and in particular microscopic anatomy there is no concept which has so profoundly revolutionized the science as that of the "cell theory"; neither is there a period which produced such enthusiasm for microscopy and such a galaxy of interesting and well known scientists as the era following its announcement by Schleiden and Schwann in 1839.

The concept of the cell theory at the time of its announcement, however, although it gave great impetus to the development of our modern microscopical sciences, was quite immature as compared with the concept of today. It required the galaxy of enthusiastic workers of the middle and latter part of the 19th century to complete this task. Although the story of the development of the concept of the cell theory is an interesting one (and I shall very briefly review it in the subsequent pages) it is not the subject which is to take our primary attention. I have used the cell theory to introduce my remarks because it was as a result of a review of its development that my interest was kindled in the life and works of a number of men who were instrumental in developing the theory as we know it today.

It is my purpose to review with you the life and works of one of the men whose name is indelibly written in the history of the cell theory; a man who was one of the few really inspiring teachers; an investigator whose new and varied angles of approach greatly modified the sum total of histological technic, and whose investigations of the special senses resulted in the most detailed account of the subject; and an editor who in the face of severe opposition successfully edited one of the most popular scientific Journals of Microscopic Anatomy.

Max Johann Sigismund Schultze was born March 25, 1825 at Freiburg (in Breisgau). His father C. A. Sigismund Schultze was at the time Professor of Anatomy and Physiology at the University of Freiburg. In 1830 when Max was five years old his father accepted a call to the University of Greifswald. Here young Schultze received his early education at home. Under the eyes of his mother Friederike née Bellermann he received the most meticulous training. His early life was largely developed around three interests, natural history, music and drawing. All possible facilities were granted him to mature along the lines of these natural tendencies. The art of drawing he developed so rapidly that at the age of fifteen years he saw one of his drawings of an Echiniscus Bellermanni published as an illustration of a paper written by his father (Echiniscus Bellermanni, animal macrobioto Hufelandii affine) for the occasion of his grandfather's golden wedding anniversary. In music too, he proved himself a master. He especially loved the violin which he played like an artist. It was this instrument which gave him diversion from his duties and much comfort during some of the more adverse periods of his later life. His interest in natural history was largely stimulated by his father's field trips in which he was permitted to take part. On these collecting trips animal forms were their main quest which fact further developed in young Schultze the zoological interest but not to the exclusion of other phases of natural history.

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* Read before the Wisconsin Medical History Seminar, University of Wisconsin, January, 1930.

In 1835 the ten-year old Max entered the Gymnasium at Greifswald which he attended until the spring of 1845. At the beginning of the summer semester, 1845, he entered the University of Greifswald as a student of medicine. Here he completed the greater part of his medical course except for the one winter semester of 1846–47 which he spent at Berlin in order to become acquainted with the great J. Müller who was attracting students from all parts of Europe. He attended Müller's lectures on anatomy and physiology. One of these lectures on the special senses greatly impressed him, but he was unmindful that before many years he himself would be an authority on this subject. The lectures on the theory and use of the Microscope by E. Brücke and Splanchnology by Schlemm were also on his program at Berlin. The greater bulk of his anatomical training however he received from his father at Greifswald.

Besides his medical studies Schultze manifested great interest in chemistry and its application to anatomical problems. Throughout his life chemistry was his hobby and it helped him find solutions to many anatomical problems and a correct understanding of the structure of certain of the tissues. So great was his interest in chemistry that already in his sophomore year he was able to publish the results of several original researches on the chemical analysis of a necrotic radius and of two human salivary calculi. Even after he had completed his medical work and had begun his teaching he continued his chemical studies as can be seen from the list of his publications. Such researches as the chemical nature of the arterial wall and the synthetic production of collogen from chondrogen were not performed by him as an end in themselves but only as a means to give him a better conception of tissues, which conception should not only help him to understand their physiological significance but also their morphological characteristics.

MAX JOHANN SIGISMUND SHULTZE.

The last two years of his medical course gave him little time for research. In the spring of 1849 he completed his medical studies and after interning for three months received his doctor's degree at the hands of his father. His dissertation for this occasion was entitled. "De arteriarum notione structura, constitutione chemica et Vita." In this paper he presented a pattern for all of his later researches. It was not a dry description of a dead object but an explanation of the chemical composition, structure and function of a living organ. In all of his researches Schultze attempted to interpret the organs, tissues or cells from both the physiological and anatomical point of view. For every structure of cell or tissue which he saw his mind craved a functional interpretation.

The winter of 1849–50 Max Schultze spent in Berlin taking his state examinations. At Easter time of 1850 he accepted the position as Prosector for his father at the Anatomical Institute at Greifswald. At the beginning of the winter quarter of the same year he was elected to the faculty of medicine in the capacity of "Privatdocent" after he had given his public Latin oration on "De theoriis nervorum actionem explicantibus." Schultze's studies at this time were primarily zoological. He made numerous trips to Rügen, Kuxhaven, and Helgoland where he collected the various Turbellaria. He especially studied their histological structure as well as the microchemical reaction of their cellular elements. It was this study which led him to discover chlorophyll within the body of these animals. His observations were published in 1851 as a monograph accompanied by beautiful drawings made by himself. His desire to continue his publications on this subject was never realized because of other researches which he considered more important. It was this publication which gave Schultze wide publicity in scientific circles. As a direct result of his monograph the faculty of Rostock granted him the honorary degree of Doctor of Philosophy in 1852. The following year (January, 1853) the faculty of Berlin gave him Blumenbach's traveling scholarship. He chose Italy for his scientific expedition. With the greatest of interest he began his studies of numerous lower forms of life which the sandy beach of the Adriatic Sea offered him. The Polythalamias with their many chambered calcium houses absorbed his attention. The calcareous shells of these foraminifera were known before, but it was the work of Schultze that gave us an understanding of their organic bodies. His monograph "Ueber den Organizmus der Polythamien nebst Bemerkungen über die Rhizopoden im Allgemeinen," published in the summer of 1854, stands as a monument to this expedition. It not only proved to the scientific world that he was an investigator of high caliber but it also presented basic facts regarding the elementary parts of the animal body which formed the foundation on which Schultze some years later built his modification of the cell theory.

It was probably as a direct result of this publication that he received a call as assistant professor to the University of Halle. He started his new duties in October, 1854. The social life of Halle was such that it demanded little of his time. Utilizing his time to the fullest for scientific endeavor, he was not prevented by the dark and cellar-like rooms of the anatomical building from finding at Halle a well of scientific achievement.

His new duties and scientific interests, however, did not prevent him from engaging in still another adventure. This new adventure was matrimony. His marriage to his cousin

Christina Bellermann made complete his busy but happy life at Halle.

During the early part of his stay at Halle the embryology of the lower vertebrates occupied most of his attention and resulted in several publications. The best known among these is the one on the "Embryology of Petromyzon Planeri" which received the prize of the Dutch Society of Sciences at Haarlem. Another group of studies which brought him renown are those on the "Pseudo-electric Organs of Rays and the Electric Organs of Fishes." The crowning product, however, of Schultze's scientific endeavors, at least as far as the medical sciences are concerned, was that of the relation of the nerves to the neuro-epithelium in the special sense organs. This work was begun while he was at Halle. The first of this series on "The Nature of the Olfactory Nerve Terminations in the Epithelium of the Nasal Mucosa" was published in 1856. This was followed in 1858 by an article on the nerve terminations in the labyrinth of fishes. These two articles opened a subject which became the major interest of the remaining years of his life.

But Schultze was not only a scientist; he was also a teacher of rare qualities. His lectures were extremely simple and informal. He never used flowery language nor oratorical style, but his simple speech was so well illuminated by his artistic use of the crayon and by his intense interest in what he presented that his students became electrified. Thus besides his publications he produced at Halle such scientists as A. Key, F. Schultze and Odenius. His fame spread over all Europe and at the age of thirty-three he was one of the best known of the younger scientists of Germany. The universities had spotted him and were waiting for a vacancy to place him. Thus it happened that when Helmholtz was called to Heidelberg that Bonn extended a call to Schultze as Professor of Anatomy. He accepted and began his duties at the beginning of the spring quarter of 1859. Located on the beautiful shore of the Rhine, established in a profession where he was free to work as he desired, and housed in a well-lighted modest laboratory ever so much better than the cellar-like rooms at Halle, Schultze found himself extremely happy.

His immediate program called for the study of the retina and a continuation of his work on the olfactory mucosa and the labyrinth. There was, however, another topic which absorbed his attention at this time, namely, the structure of the cell and its place in the cell theory of Schwann and Schleiden. His early studies on rhizopods and on the movement of protoplasm and on the division of cells gradually led him to feel that the cell theory as it was then known was inadequate.

In order to understand his problem let us briefly review the development of the cell theory. Almost two centuries before Schultze's modification of the cell theory Robert Hooke (1665) noticed the spaces in cork which reminded him of minute prison cells. He therefore applied to them the term cell. This observation was again made by Malpighi (1675) and Nehemiah Grew (1682). Little more was learned about these cells except that they were more or less prominent in both plants and animals, until 1831 when Robert Brown described the nucleus of the cell. The nucleolus was next described by Gabriel Valentine in 1836.

In 1838 Matthias Jacob Schleiden published his paper in which he emphasized the importance of the nucleus in the cell. He saw and proved that plant tissues are made up of and develop from groups of cells of which he recognized the nucleus, or cytoblast, as the important feature; but he held that young cells originate spontaneously from the cytoblast, which he thought to be encased in the solid cell wall. He regarded the young cells as resting upon and expanding over the cytoblast like a watch crystal over a watch, an idea which became known as the "watch glass theory" (*Uhrglasstheorie*). Thus he regarded reproduction as endogenous (free internal formation) instead of by division, and the cell wall as a solid and essential structure instead of a semipermeable and not necessary membrane.

In 1839 Schwann[1] published his crowning work on the cell theory. This announcement of the cell theory he presented in a little book entitled "Mikroscopische Untersuchungen über die Ubereinstimmung in der Structure und dem Wachsthum der Thiere und Pflanzen." Today we herald this theory as the foundation of modern biology. To the scientific world Schwann's name is immortalized in this theory. In the face of actual facts, however, it seems that this immortalization carries with it more praise than Schwann in reality deserves. It is often the thoughtful bystander whose mind is not preoccupied with the details of the individual parts who correlates the labors of others into a single fundamental principle. Thus in the time of Schwann everything was ripe for the reception of the cell theory. The microscopic study of animal tissues and plants was daily revealing new structures which were made up of cells. Cells had long been known and described and at the time of the presentation of this theory many of the tissues were known to be made up of cells. As the leading botanist of his time, Schleiden had demonstrated the cellular nature of all plants. In the zoological field tissues had been described as being made up of kernels, small balls or small sacks or sometimes as cells by such men as Müller, Henle, Purkinje, Ehrenberg, Valentine, Dutrochet and Robert Brown. In practically all of these structures nuclei had been discovered before the presentation of this theory. And thus almost daily new tissues were found to be made up of cells. Even chemists were trying to find the unit of animal structure. Such chemists are represented by Raspail who compared starch granules with fat cells.

Not only was the practical world ready for such a unifying theory as the cell theory, but the a priori reasoning of the philosophers such as Epicure and Leibnitz demanded a unitary basis for the manifold manifestations of nature. Thus arose among philosophers the "monad theory." Schwann, who was a devout Catholic thinker was also somewhat of a philosopher and was greatly influenced by the monad theory of Leibnitz which may have been a constructive element in the formulation of the cell theory.

The incident, however, which was the most direct cause of the formulation of the cell theory was the meeting of Schwann and Schleiden in October 1838. It was at the dinner table that

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[1] Beitrage zur Phytogenese. *Müller's Arch.*

Schleiden related to Schwann his findings and theories regarding plant structures. Schwann was struck at once by the similarity of cell structures of which Schleiden spoke and those which he observed in the chorda dorsalis which he was then studying. Schleiden also told him of the nucleus of the plant cell which he regarded as the mother of new cells and therefore called it the cytoblast. It was his idea, which he felt was substantiated by observations, that this cytoblast contained very small young cells which gradually grew and then budded out from the mother cell. Thus Schleiden believed that plants started with a single mother nucleus which contained many young cytoblasts gradually giving rise to the adult plant. After this dinner Schwann took Schleiden to his laboratory and showed him sections of the chorda dorsalis in which Schleiden at once recognized the cells and nuclei which he said were very similar to those of plants.

When we consider all of these conditions; the philosophy of the time; the discovery of cells in almost all tissues; and then the inspiring conference with Schleiden, it is very easy to understand how an open and correlative mind like that of Schwann reached a conclusion so universal in its scope. If we say that it was the unripeness of the time and a matter of hard luck that he did not receive the laurels of Lister and Pasteur which he at least in part deserved as a result of his researches on putrefaction through which he disproved the theory of spontaneous generation, then we must say that it was the ripeness of the time and a matter of good luck that his name is immortalized in the cell theory which honor at least in part belongs to Schleiden and even to Carl Ernst von Baer who first noticed the segmentation in frog eggs. Baer, when he first saw these segmentation furrows considered them as artifacts, but with the appearance of the cell theory recognized this segmentation to represent the true method of cell multiplication instead of the budding method suggested by Schleiden and Schwann.

Schwann's conclusion that all animal organs were made up of cells was based on his embryological findings that the organs are developed from the three-germ layers and these layers he found to be made up of cells. He also noted that such structures as nails and cuticle were of cellular nature and not a mere secretion. Schwann had not observed definite cell structure in such tissues as muscle and connective tissue of blood vessels; but he had noted the nuclei of such structures. Because he did not find definite cells in all structures he divided tissues into five classes: (1) isolated cells like those found in the blood and lymph; (2) independent cells which are loosely united such as cuticular cells, pigment cells and cells of the crystalline lens; (3) tissues whose cells are fused with each other through and intercellular substance such as is the case in cartilage, bone and teeth; (4) tissues whose cells arrange themselves into fibrous bundles such as collagenous and elastic tissue; and (5) tissues whose cell walls and cavities fuse as is the case in muscle, nerve tissue and in the walls of capillaries. This classification shows that the true cellular nature of all tissues was still imperfectly known.

While Schwann's presentation of the cell theory was sound, fundamentally it by no means was free of errors or misconceptions. In the first place the conception of the cell as a space surrounded by a wall and containing a nucleus (Cytoblast of Schleiden) was devoid of the formed cytoplasm which von Mohl described some years later and is now regarded as the chief body of the cell. Schwann added to Schleiden's concept the term cytoblastema or matrix of cell development analogous to the mother liquor from which crystals spring. His theory of cell multiplication which he borrowed from Schleiden turned out to be erroneous. Apparently Schwann was on the right track when he made the following statement regarding the segmentation furrows which von Baer and Rusconi had noted in frog eggs: It is to be investigated whether or not the splitting of the egg is dependent upon a process of cell formation, in that the egg is split into two cells and then each of these in turn split into two more, etc.[1] It was von Baer who immediately after the announcement of the cell theory realized that this latter view was the correct one, and not the one presented by Schwann.

In 1840 Virchow stated that pathological structures were not strange but only the result of abnormal cell growth. He also pointed out that Schwann's concept of cytoblastema as a mother liquor from which other cells spring was a tacit acceptance of "spontaneous generation," the very theory which Schwann previously discredited as a result of his putrefaction experiments and which, after his announcement of the cell theory, he did so much to overthrow.

Purkinje in 1839 first used the term protoplasm applying it to the germinal ground substance of the embryo. Hugo von Mohl (1846–51) described the content of the vegetable cell (just under the cell membrane) as "protoplasm." Ferdinand Cohn (1850–52) declared that animal and vegetable protoplasms are analogous, if not identical substances. Virchow (1858) announced the continuity of cell development and its importance in pathology.

This was the status of the cell theory when Max Schultze began his attempt to modify it. The cell was still regarded as a bubble-like structure with a definite membrane containing a nucleus. The emphasis was placed on the cell wall and the nucleus.

In 1836 Dujardin attempted to place importance on the cell content other than the nucleus. He employed the term *sarcode* to designate all of the substances of the cell except the nucleus. In this concept he virtually denied a cell membrane. His term sarcode was used for some time but the concept of the absence of a cell membrane outside the sarcode received little recognition.

In 1861 Schultze published his epoch making article on "Muscle bodies and what one is to call a cell." The place of the cell in muscle tissue was still one of great controversy. Some held that the nuclei of the muscle fibers were the cells and the fibrils were intercellular material. Others looked for small cells between the muscle fibrils. Schultze showed that each muscle fiber or primitive muscle bundle was developed from a single myoblast by successive divisions of its cell or nucleus and that thus the entire muscle fiber would have to be regarded as either a colony of fused cells or as a multinucleated cell. He leaned to the former because of his researches on polythalamias which are colonial animals in which the individual cell outlines are not apparent. He then takes up the question of the cell membrane and shows that in many of the one-celled and colonial forms no cell wall could be demonstrated and that therefore the cell wall was a nonessential concept of the cell theory. The definition of a cell was always given as a "bubble-like structure with cell membrane content and nucleus." Schultze reasoned that the egg cell was the most important cell since it gave rise to all cells of an organism. But since the eggs had no demonstrable cell membrane he concluded that the membrane could not be considered an essential element of the cell concept. He emphasized the cell protoplasm which had sufficient consistency to retain the cell form or outline. He therefore defined the cell as a mass of protoplasm containing a nucleus. Shortly after this publication E. Brücke, who had worked independently of Schultze, published an article presenting the same conclusions. These revolutionizing statements regarding the cell theory received no open criticism until 1863 when Reichert, a staunch adherent to Schwann's statement of the cell theory, published his criticism of this proposed reform. (It is of interest that Schultze published only three other articles in Reichert's *Archiv*, two in the same year 1861 and the other in 1862.) In his lengthy address before the Königlichen Academy of Science at Berlin and which was published in his *Archiv* of 1863, Reichert states that under protest he consented to publish Schultze's new doctrine of the cell theory because of pressure brought and because it was a complete piece of work.

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[1] Es wäre zu untersuchen ob nich die Spaltung des Dotters auch auf einem Zellenbildungs process beruht, indem sich innerhalb des Dotters zunächst zwei Zellen entwickeln, in jeder derselben wieder zwei neue u.s.f.

He further intimated that he did not think Schultze's revolutionary article would influence the well-established concept of the cell theory. But when Brücke's similar article appeared Reichert could contain himself no longer; although reluctant to criticize he felt the urge to squelch such revolutionary views. In this article and in a second article in the same volume of the *Archiv*, Reichert unwisely attacked Schultze's observations on the movement of the protoplasm in Polythalamias, a field in which Schultze was recognized as an authority. This afforded great amusement to Schultze as may be gathered from his reply entitled, "Reichert und die Gromien." Schultze very openly and somewhat sarcastically pointed out Reichert's very superficial observation.

This controversy cut off Schultze from publishing in Reichert's *Archiv*. Thus during the period of 1862 to 1865 he published his work in the *Archiv für Naturgeschichte, Virchow's Archiv, Proceedings of Several Scientific Societies, Medizin Centralblatt;* he also published several monographs. One of Schultze's important publications presenting his discovery of the prickle cells in stratified squamous epithelium appeared during this period in *Virchow's Archiv* (1864).

With the rapid progress of microscopical study Schultze felt the need of a journal devoted to this field. In spite of Reichert's severe attack, Schultze's and Brücke's new concept of the cell theory was accepted by most of the prominent scientists and as a result the attempt to start a new microscopical journal, although it was considered as unnecessary even by many of his close friends, was not as hard a task as might be expected. Schultze circulated letters in order to determine what support he could expect from the German scientists in this undertaking. In his introduction or "Prospectus" as he called it, to volume 1 (1865) besides stating the purpose of this *Archiv für Mikroskopische Anatomie,* he lists the following men who promised their support: de Bary, Berlin, Brücke, V. Carus, Cienkowsky, F. Cohn, Dippel, Donders, A. Ecker, Eberth, Frey, Funke, Gegenbaur, Gerlach, Haeckel, Harting, Heidenhain, Hensen, His, Hoffmeister, Klebs, Kölliker, Krohn, Kühne, Kupffer, R. Leuckart, Leydig, Ludwig, Luschka, H. von Mohl, Fritz Müller, Naegeli, Pagenstecher, Pflüger, Pringsheim, von Recklinghausen, Rindfleisch, Rollet, J. Sachs, O. Schmidt, C. A. S. Schultze, von Siebold, Stein, Thiersch, M. Traube, Troschel, von la Valette, Waldeyer, O. Weber, Weismann, Welcker.

In spite of opposition this *Archiv* achieved such popularity under the efficient scrutiny of Schultze that the volumes increased in size and later several volumes a year had to be published. Schultze published the first nine volumes before death claimed him. Volumes 10–53 (1874–1899) were published jointly by von la Valette St. George (Bonn) and Waldeyer (Berlin). With the beginning of volume 54 the publication was renamed *Archiv für Mikroskopische Anatomie und Entwickelunggeschichte* and was published under this name by O. Hertwig, von la Valette St. George and Waldeyer through volume 94, 1920. Volumes 95 (1921) to 97 (1923) were published by O. Hertwig. Volumes 98 (1923) to 104 (1925) were published under the name *Archiv für Mikroskopische Anatomie und Entwickungsmechanik* by Wilhelm Roux, H. Braus, and H. Speman. In 1925 it was merged, and known as *Zeitschrift für Zellforschung und Mikroskopische Anatomie* and is listed as Division B of the *Zeitschrift für wissenschaftliche Biologie.* This publication is current at the present time.

We must turn back to those early extremely busy years at Bonn. Besides his work and controversy regarding the cell theory Schultze continued his study of the nerve endings in the olfactory mucosa, labyrinth and retina. It was this work on the retina in particular which he pursued to the end of his life. His accurate observations and his drawings made by his own skilled hand make his numerous publications on the retina among the foremost of his products. While he was occupied with the eye his own students, foremost among whom was G. Schwalbe, continued the study of the other special senses. When Stricker wrote his "Handbuch der Lehre von den Geweben," Max Schultze was given the honor of writing the chapters on the retina and nerve tissue. Many of his drawings are still used in our present-day textbooks.

Other of Schultze's contributions dating from this period are his technical helps. He brought into use osmic acid, dilute chromic acid solution as fixatives and iodized serum as a preservative. His work on the muscle cells besides modifying the cell theory also started among histologists a search into the nature of intercellular tissue and its relation to cells. In 1863 he gave one of the best contemporary descriptions of the segmentation furrowing of the egg.

It was also during this period, in

connection with his study of protoplasmic movement and cell membranes, that he made his observations on the movement and on the lack of a cell membrane of the white blood corpuscles. This observation was published in 1863 as a special monograph. It was in connection with his study of the blood that he invented a heatable stage for the microscope. A description of this hot stage together with his observations on white blood corpuscles appeared as the first article of the first volume of his *Archiv* (1865).

Another discovery which he made was that of the prickel cells in the stratified squamous epithelia. His interpretation of this phenomenon, however, is not in accord with our present day one. This article was published in 1864 in *Virchow's Archiv*.

His exceedingly great activity during these first years at Bonn, unnoticed by him, began to gnaw at his vitality which resulted in the development of duodenal ulcers. His friends again and again begged him to ease up a bit in order to conserve his health. In the autumn of 1865 he heeded their request and with his wife visited the beach at Ostende. But fate was against him. Instead of returning to his work refreshed from his visit to the sea he returned broken hearted. His wife contracted typhoid fever and died. But his troubles were not yet at an end for during the following year both of his youngest sons were claimed by the grim reaper.

From this grief Schultze found comfort in his researches which from this time on were on the retina. Music too brought him comfort during his free time. He was as already stated a great friend of the violin and enjoyed nothing better than a musical evening at his home with his friends.

In 1867 he seemed to take a new outlook on life. When Schwalbe returned to Schultze's laboratory during this year he found him as fresh and energetic as ever. During the autumn of the same year he attended the Congress of Scientists at Frankfurt A. M. and the World's Fair at Paris. On January 8, 1868 he returned to Greifswald to attend the Golden Doctor Jubilee of his father, and for this occasion prepared a Festschrift on the Eyes of Crawfish and Insects.

Several months after his return he married Miss Sophie Sievers and again was happy in his home life. It was about this time that Schultze was engaged in building a new anatomical building. The government gave him sufficient funds to construct an institute which should stand as a model for all German universities. Under the careful and farseeing care the building indeed became a model.

In the midst of this building program he received two calls to other universities. The University of Strassburg which was just being founded desired to obtain the best faculty in Germany and calls were extended only to the foremost scientists. Schultze was among these but he declined because he did not care to leave the half finished anatomy building in other hands. Soon after he received the call from Leipzig to become the successor to E. H. Weber. The offer was exceedingly attractive but again he decided in favor of Bonn.

In October 1872 his anatomy building was completed and he at once began to build a home for himself near it. Thus all plans were completed for a comfortable stay at Bonn. The busy building program however left little time for research and Schultze regretted this for he on one occasion stated that the duties connected with a building program did not befit an educated man.

With the new year of 1874 the Schultze family opened their new home, and on this occasion they were happily surprised by the visit of a group of their friends. In a toast given on this occasion Schultze voiced his joy that the building program was completed and that he now could return to his researches. He stated that he had now reached the moment which he had so longed for during the past three or four years. A moment about which he said "Verweile doch, du bist so schön" [Please remain, you are so nice].

But this moment did not remain. Not many days after this pleasant evening the sad news reached his friends that Max Schultze was no more. On January 16, 1874 a perforating duodenal ulcer unexpectedly tore, as it were, this great teacher and scientist from the midst of his productive labors, his friends and his family.

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LOUIS LEWIN

PHARMACOLOGIST, TOXICOLOGIST, MEDICAL HISTORIAN*

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On the first of November, 1929, there died in Berlin, at the venerable age of seventy-nine, Louis Lewin, one of the most eminent of modern pharmacologists, whose death is a loss not only to colleagues in his chosen field of experimental endeavor but to all students of science, on the one hand, and of the humanities, on the other. It is my privilege to say here a few words in memory of this remarkable personage and I welcome the opportunity not only as a colleague of Professor Louis Lewin but because the life and work of this man are peculiarly suitable for study in connection with the newly organized Department of Medical History of Johns Hopkins University and the Welch Library. I, myself, and many others, who have been interested in the activities of the Johns Hopkins Medical Historical Society for many years, were unquestionably inspired by some of the brilliant addresses delivered at the dedication of the Welch Medical Library and, more particularly, by the masterly oration of Professor Harvey Cushing, who so forcibly described the progressive tendency toward decentralization in medicine that has been going on for the past twenty-five or thirty years hand in hand with successive splittings off of new groups from both preclinical and clinical departments, many of which specialties have attained sufficient strength and dignity to be recognized as independent units. I and, I am sure, many others agree with Professor Cushing's statement that more and more our newer medical students, as well as the incumbents of the preclinical chairs of our schools, are becoming men and women whose scientific interests may be quite unrelated to anything that obviously has to do with medicine and that there are not a few of such medical men who, indeed, confess to a feeling that by engaging in problems that have an evident bearing on the art of healing and on the broader sociological and humanistic aspects of medicine, they lose caste among their fellows. Quoting verbatim from Cushing's address:

> May we not ask whether in a modern development of the physician into the scientist we have not lost something precious that may, without risk of pedantry, be brought back to medicine? Not only has the art of healing, *die Heilkunst*, come more and more to be lost sight of as the doctor arrives at his diagnosis in the laboratory rather than at the bedside, but less and less does he care to be reminded of the fact that poetry, history, rhetoric and the humanities once had close kinship with natural history and with medicine, when the *doctores medicinae* took the leadership among the *artisti*.

The whole life and work of the man, whose departure from this world I am commemorating, is one of the finest examples of the older ideals of the physician who combined with his strictly scientific spirit of inquiry and experimental investigation a breadth of outlook embracing every phase of human activity and a profound erudition not only in all the natural sciences but in the humanities, which he utilized for the better and more harmonious development of his calling. Perhaps a brief review of Professor Lewin's biography and work may therefore serve not only as a tribute to his memory by a fellow pharmocologist but also as an incentive to medical students toward those ideals which are never antiquated and which have been so aptly emphasized by the new activities of this historical society in connection with the new chair for the history of medicine and the Welch Medical Library, Johns Hopkins University.

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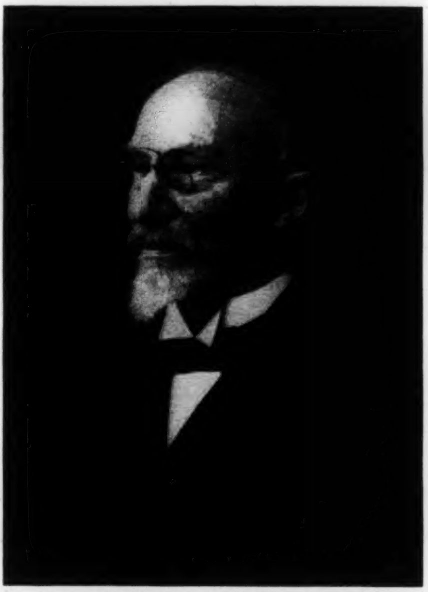

Professor Louis Lewin.

Louis Lewin was born November 9, 1850, in the small town of Tuchel, Western Prussia. In his boyhood and early youth, he received the regular elementary high school education of the German provinces together with the fundamentals of classical and Oriental languages. At a very early period he was drawn to the study of natural sciences and, more particularly, of medicine. Beginning with the year 1871, these studies were carried on at the University of Berlin. Here, in 1875, he received his medical degree, and in 1876 he was established as a full-fledged physician. This was followed by a period of study under Pettenkoffer and Voit in München from which place he was called as an assistant to the Pharmacological Institute in Berlin under Liebreich in 1881. At that time, he decided to specialize in pharmacology and toxicology and his brilliant work along those lines won for him the honorary title of professor in 1894.

The fifty-five years of Lewin's life extending from 1874 to 1929 were one continuous period of indefatigable activity devoted to experimental investigations and distinguished by a literary output unsurpassed in quantity and quality by any other pharmacologist in the history of medicine. This activity was interrupted only by a cerebral hemorrhage which partially paralyzed him at the age of seventy-eight but fortunately left his mental faculties intact. Through the devotion of his wife and friends, he was nursed back to partial recovery and soon resumed his intellectual labors, directing research, writing papers and even traveling to give lectures. It was at this time that he became interested in the remarkable properties of the new drug, banisterin, obtained from a South American plant which has been used from time immemorial for the treatment of senile paralysis in particular and as a nerve sedative in general. Soon, however, Lewin developed a febrile condition which confined him to bed and he began to fail rapidly and finally passed peacefully away at the age of seventy-nine.

I have before me a list of Lewin's writings, about two hundred and thirty publications in all, which include scientific and historical papers testifying to the profound scholarship, incessant experimental activity and marvelous versatility of the author. It is obviously out of place to name all of his publications; but in order to give an adequate estimate of Lewin's contributions to medical science and human knowledge in general, it is appropriate to mention some of his more important works.

A good idea of the versatility and vast intellectual energy of the author can be obtained by merely glancing at the names of the various periodicals or journals in which Lewin's work was published. It is needless to say that the acceptance of his papers by certain high-grade journals is in itself *prima facie* evidence of his scientific standing. On looking over the scientific media in which Lewin's publications appeared, I find some sixty periodicals, including both clinical and experimental or purely research journals. Thus, we find Lewin's contributions published in the *Deutsche medizinische Wochenschrift*, the *Berliner klinische Wochenschrift*, the *Münchener medizinische Wochenschrift*, and the *Lancet*, on the one hand, and in strictly technical journals, like Schmiedeberg's *Archiv für experimentelle Pathologie und Pharmakologie, Virchows Archiv für pathologische Anatomie, Pflüger's Archiv für die gesammte Physiologie, Zeitschrift für Biologie, Langenbeck's Archiv, Archiv für Anatomie und Physiologie and the Zeitschrift für Hygiene*, on the other. Again, we find Lewin's experimental researches published in more pretentious journals for clinical investigations such as the *Archiv für klinische Medizin, Archiv für Chirurgie*, the *Comptes Rendus de l'Academie des Sciences*, and in the transactions of various leading academies and international congresses. Other contributions are to be found in pharmaceutical journals such as the *Pharmaceutische Zeitung, Archiv der Pharmacie* and *Apotheker Zeitung*. We find Professor Lewin writing as a chemist in the *Berichte der Deutschen chemischen Gesellschaft*, in the *Zeitschrift für angewandte Chemie* and in the *Chemiker Zeitung*, while papers of a purely physical nature, such as that on spectroscopy in connection with carbon monoxide poisoning, etc., will be found in *Annalen der Physik*. Furthermore, his erudition in the matter of drug sources can be gathered from articles in the *Berichte der Deutschen botanischen Gesellschaft* and in the *Botanische Jahrbücher*. These journals, however, were not sufficient to embrace the scope of Lewin's intellectual outlook and interests. As a medicolegal and toxicological expert, he also wrote for special journals such as the *Deutsche Juristenzeitung*, the *Arztliche Sachverständigen Zeitung, Amtliche Nachrichten des Reichs-Versicherungsamtes*, and *Annales d'hygiène publique et de médicine légale*. You will find his writings also in the *Verhandlungen der Berliner anthropologischen Gesellschaft, Der Archäologischen Gesellschaft*, the *Zeitschrift für Ethnologie*, the *Zeitschrift für Reproduktionstechnik*, the *Zeitschrift für das gesamte Schiess und Sprengstoffwesen, Zeitschrift der Gesellschaft für Erdkunde* (concerning geological chemistry), in the *Zeitschrift für ägyptische Sprachen* (concerning pharmacological properties of certain salts) and in scientific journals of a general nature such as *Die Umschau, Revue Scientifique* and *Die Naturwissenschaften.*

Lewin's contributions to science can be logically divided into three categories: the first embraces his purely experimental investigations in anatomy, physiology, pharmacology, toxicology and pathology with occasional studies of a chemical and physical character; the second includes his well-known text or reference books, embodying his own experimental data together with an almost incredible amount of information gathered from reading and other sources; in the third category are to be placed Lewin's contributions to the history of medicine.

As a scientific investigator, and particularly in pharmacology and toxicology, hardly any specialist in this field has carried on experimental work on a larger variety of subjects than he did. Lewin was one of the first to study chronic morphinism and his investigations on narcotics include not only opium and its various alkaloids but many other substances of a narcotic or intoxicating character. Thus, for instance, he did experimental work on the curious plant drug known as Kawa Kawa, the betel nut, Cannabis indica, and other intoxicants; and he was the discoverer of the curious narcotic properties of anhalonium, which was named after him Anhalonium Lewinii. Studies on ethyl alcohol dealt particularly with the fate of that chemical in fever. Furthermore, he published an original work on wood alcohol, the higher alcohols, pharmacology and toxicology of glycerin, acrolein, and chloroform. In connection with the important group of digitalis bodies, Lewin's interest was directed especially to strophanthin and the closely related substance, ouabain, or crystalline strophanthin, and was extended to the much rarer, though chemically related bodies, erythrophlein and acocantherin. His interest in these rarer glucosides with digitaloid properties was stimulated through his particularly well-known investigations on a large variety of arrow poisons, concerning which he wrote a most interesting monograph. This includes in addition to the alkaloids, mentioned previously, a great many rarer poisons, such as those from Haemanthus toxicarius, Blepharida Evanida, Calotropis procera, Vernonia hildebrandtii, Haya poison, etc. In this connection, mention should be made also of his contributions to the toxicology of snake venoms. Cantharides and cantharidin, the poisonous principle obtained from the Spanish fly, were studied extensively by our pharmacologist, and he was the first to discover the fact that certain animals, like the hedgehog, are immune to the effects of this deadly poison. Under the heading of antiseptics must be mentioned Lewin's discovery of the antiseptic and antifermentative properties of thymol and his work on iodoform, and picric acid, salicylic acid, chrysarobin, etc. Antipyretics also received contributions from Lewin's laboratory. A group of drugs in connection with which Lewin's work is very well known, both from the physiological and historical point of view, are the emmenagogues and abortifacients. Among various alkaloids which received his attention, in addition to those of opium, were aconitin, strychnine, quinine, banisterin, the whole gamut of ophthalmic drugs, that is, those belonging to the belladonna family, atropine, hyoscyamine, hyoscine and pilocarpine, physostigmine, etc. As a toxicologist, Lewin was also interested in the curious poison solanine found in unwholesome potatoes. As a toxicologist, Lewin was furthermore especially interested in poisonous gases. These include carbon monoxide, concerning which he published a very valuable book embodying his own experimental investigations as well as complete statistics and experimental data collected from every imaginable source. He worked on and published concerning poisoning with hydrocyanic acid, potassium cyanide, benzol, ammonia gas, nitrobenzol, mesitylene, nitrous fumes, trinitrotoluol, and acetylene. It may be interesting to note in this connection that Lewin was one of the earliest investigators to study quantitatively the presence of acetylene gas in the blood. The whole gamut of heavy metals was material for other pharmacological and toxicological investigations, and we find published contributions by our colleague on bismuth poisoning, on the therapeutic and poisonous properties of arsenic, mercury, and aluminium, on chromium and copper poisoning, on the toxicology of antimony and phosphorus, the pharmacology and therapeutics of iron and, especially, on the toxicology of lead. Lewin was one of the earliest investigators to show that lead poisoning may occur from absorption of the metal in case of gunshot wounds. Among his toxicological studies we must also mention those on carbolic acid. Of a more pharmaceutical character are the publications of Lewin on various apparatus, on flavoring agents, extraction and demonstration of fats, waxes and resins from crude drugs, the preparation and use of suppositories, etc. This by no means exhausts the list of subjects on which our friend labored and concerning which he published. We may mention, furthermore, his contributions to the pharmacology of ethereal oils, of catechu, of finely divided carbon, of petroleum, santonin, arbutin and uva ursi. One of Lewin's strong points were his contributions to the pharmacology, physiology, and physical chemistry of the blood. In connection with his study of blood poisons, Lewin developed methods of blood spectroscopy and spectrophotography; he studied absorption of various ultraviolet light waves by blood of animals in toxicological cases, and was also one of the first to inquire into the absorption of infra-red radiations by blood. Of a more purely physiological character are his studies on the absorption of poisons through the skin, on hematuria, air embolism, respiration, physiology of sleep, and the physiology of the bladder, ureters and pelvis of the kidney. Mention should be made of Lewin's contributions to the treatment of leprosy and study of various infectious diseases such as anthrax.

Because of his extraordinary popularity and ability as a lecturer and teacher, Lewin was induced to publish a number of books embodying his own investigations together with a digest of the encyclopedic knowledge which he possessed. A number of these works have become classics in pharmacological literature. They have been republished a number of times and translated into various languages. One of these I have already mentioned, "Die Kohlenoxydvergiftung," which discusses the subject of carbon monoxide poisoning from every conceivable angle, historical, statistical, pharmacological, toxicological, clinical, pathological and sociological. Perhaps the two best known reference books by Lewin are his "Die Nebenwirkungen der Arzneimittel" and his "Toxikologie." The first of these is a unique and remarkable production; indeed, the only work of its kind in medical literature. It is devoted to the consideration of the borderline between pharmacological and toxicological actions of drugs; in other words, it deals with so-called untoward or by-effects of all kinds of medicinal substances. This volume presents an enormous amount of invaluable information on the subject dealing with the unusual, mildly toxic effects of drugs and with the idiosyncrasies exhibited by patients in connection with pharmacotherapy. Although the last edition of this contribution appeared in 1899, its unique place in the domain of pharmacology and toxicology has not been arrogated by any other publication and on account of its wealth of information and its lucid style, it has remained a classic of its kind retaining, in the domain of pharmacology, a fascinating hold on the medical student and practitioner much like that of Osler's "Practice" in the domain of clinical medicine. This work is the resource of every toxicologist or pharmacologist when dealing with puzzling manifestations in connection with drug action. The other monumental work of Professor Lewin is his "Toxikologie," a fourth edition of which appeared only last year under the title of "Gifte und Vergiftungen." It is no exaggeration to state that this single volume of nearly eleven hundred pages is hardly surpassed in content and attractiveness of presentation by any other work on toxicology in modern medicine and is to be classed in the same exclusive rank as the more voluminous work of the famous toxicologist Kobert. Mention must also be made of a large handbook concerning drugs used in ophthalmology, "Die Wirkungen von Arzneimitteln auf das Auge," a work in two volumes published by Lewin jointly with Guillery.

Turning now to Professor Lewin's activity as historian, which is of particular interest here, it is not surprising to find that this scientist with such profound scholarly background and broad philosophical outlook on the varied phenomena of life, was fond of approaching scientific problems through historical channels. In the domain of pharmacology and toxicology, perhaps more than in other branches of medicine, the historical approach is of the greatest value, and much of our research material, though in crude form, can be found in ancient histories of plants, animals, and old medicaments. Professor Lewin published numerous papers and a number of most interesting books of a medico-historical character. Some of these were compiled in connection with his experimental researches, others were stimulated by his interest in general medicine and sociology. Thus, for instance, in connection with his studies of digitalis bodies, Lewin was led to investigate the history of arrow poisons, some of which are heart poisons; and his historical studies on this subject were published in 1894 in the form of a monograph entitled, "Die Pfeilgifte." Many such papers of historical interest are published by him in the *Berliner klinische Wochenschrift*, in the transactions of the *Berliner anthropologische Gesellschaft*, *Zeitschrift für Ethnologie*, and in the *Archiv für die Geschichte der Medizin.* The volume on carbon monoxide poisoning contains abundant historical material. A most remarkable and extraordinary piece of historical literature is "Die Fruchabtreibung durch Gifte," which deals with the history of abortifacients and contains an examination of every variety of drug or poison employed throughout all ages by unscrupulous individuals for the purpose of inducing abortion or the prevention of conception. Even a cursory examination of this volume will reveal the scholarship of the writer. Turn the leaves and you will find quotations in the original from Hebrew, Greek and Latin, from French, German and other languages. Here is given a digest of legislative statutes concerning induction of abortion and prevention of conception, abstracted from the records not only of every European and American country but from various African, Asiatic and Polynesian parts of the world. In 1892, an interesting paper by Lewin appeared in the *Münchener medizinische Wochenschrift,* entitled, Heilmittel und Gifte bei Homer, or Drugs and Poisons in Homer. A monograph on narcotics reading much like a detective thriller is "Phantastica," published by the author in 1924 and 1925. The most important contribution to the history of medicine, however, is Lewin's "Die Gifte in der Welt Geschichte," or "Poisoning in the History of the World."[1] This contains a history of poisonings from most remote times to the present and is enhanced in value by innumerable citations from ancient and modern literature. It is well-nigh impossible for an ordinary individual to believe how one man in his leisure hours could compile such a tremendous fund of information and put it in print in such an interesting form.

A proper appreciation of the life and work of any individual scientist, artist, or other creative genius, cannot be given without at least a few words concerning his personality. At the recent Thirteenth International Physiological Congress, held in Boston in August of last year, Professor August Krogh, who has since received the Nobel prize, made the following remarkable statement in his address on the progress of physiology, "We may fondly imagine that we are impartial seekers after truth but, with a few exceptions, to which I know that I do not belong, we are influenced, and sometimes strongly, by our personal bias and we give our best thoughts to those ideas which we have to defend." This most interesting statement by a biologist, of course, does not mean that scientists are swayed by their personal interests or emotions in the actual performance of our experimental work but it does mean, I take it, that just as in fine literature the style stamps the man, so in scientific endeavor, each one of us has his individual predilections and interests which lead him to work on problems different from those chosen by other individuals and to employ special methods which he has evolved through his own peculiar ingenuity. This variety of interests, of course, is conducive to the progress of science and the advancement of knowledge in general. In the scientific world, as much as in any other walk of life, it is absolutely necessary that we be true to ourselves and staunchly defend those principles which we are convinced are true. Of Professor Lewin, as of all great scientists and leaders of mankind, it can well be said: He was a man of strong character and positive principles which he would not barter for any material advancement or sacrifice at any cost. If we study the character of this individual, several traits will be found outstanding. One of these is his love for truth, the search for which spurred him on all his life, and what is science but the search for truth! He hated commercialism in any form and for this reason he was an enemy to the high pressure tactics and extravagant advertising propensities of drug manufacturing houses, from which he could have gathered heaps of golden ducats had he cared. He was an expert on toxicology, but his scientific skill was never bribed by wealth or influence. In most such cases, he undertook the defense of those without means. Lewin was also strongly opposed to war and it is to his credit that but a short while before his death, he traveled to address a peace congress in order to express his disapproval of poison warfare.

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[1] Published by Springer in Berlin in 1920.

A single trait of this my colleague, however, will give a truer picture of the man than all I said. It is an open secret, in fact, it is no secret at all that Louis Lewin, even when a very young man, could have obtained the leading professorship of pharmacology and have been an *ordentlicher*, or director of a university department, *if* he had been willing, so it was suggested, outwardly at least, to give up his faith. In honor to his memory be it stated and to the shame of junkerdom and all those so-called scientists who drag religious and social prejudice into the halls of science and of higher learning, be it put on record, and there are many such in every land and even in these our United States, Lewin refused with scorn and contempt all such ignoble proffers. He was, and he always remained, an active member of the *Allegmeine Jüdische Gemeinde* of Berlin. In this connection, we may note that such was also the experience of another pharmacologist, Paul Ehrlich. He, too, was not appointed university professor or director of an institute because he was—*himself;* and it was only through the efforts of his friends that Speyerhaus was built for his researches; and there he worked in chemotherapy and other lines and gave to medicine his compound 606. Lewin was not so fortunate but to his dying day was forced to drudge and toil in his dingy apartment, in Ziegelstrasse, which none the less became the Mecca of physicians and students from every quarter of the globe. We suspect our friend was not only a pharmacologist but also a philosopher. He must have held before him as a motto some such dictum as that of wise Ecclesiastes (VII, 12),

W'yithron da-ath—ha-hakhmah t'hayeh b'aleha,

which may be literally rendered thus:

> The superior excellency of science is—wisdom:
> 'Tis science taken wisely, science wisely pursued, wisely applied,
> That giveth life and maketh life the more worth while.

This is the picture of Louis Lewin, pharmacologist, toxicologist, medical historian, keen scientist, brilliant teacher, profound scholar, fascinating writer, a man of noble character, lofty ideals, and loyal to his race and faith.

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REFUTATION OF THE CHARGES OF COWARDICE MADE AGAINST GALEN

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NUMEROUS and successful investigations in anatomy and physiology elevated Galen to a unique pedestal. While agreeing on this eminence, and rightly so, modern medical historians also agree, though wrongly, in making him out a coward. This has not only reflected an unfavorable light on him as a man to be imitated, but has tended to impair his standing as a scientist. With the evidence before us, that his life was a manifestation of resolution and courage, it is a satisfaction in this year, the eighteenth centenary of his birth[1] to refute the slander.

He has been accused of cowardice on two counts: First, that he ran away in a discreditable fashion from an uprising associated with, or endangering, his native city Pergamum in Asia Minor;[2] second, that he ran away from a pestilence in Rome. For a complete understanding of his conduct in both instances, a little sketch of his life and times is necessary.

Delicate in childhood (vi, 309)[3] Galen took the studies commonly pursued in the elementary grades from his father, but at the age of fourteen we find him in attendance at the philosophical school (v, 41 et seq.). He entered medicine in his native city Pergamum at the age of seventeen still a little delicate (vi, 309, 755), and finished at twenty-one. Shortly before, his father died (vi, 756) and left him such a competence that he never knew the need of money (v, 44 et seq.; xiv, 623).

Enthused by personal acquaintanceship (xix, 16) with some of its well-known medical men, he went to Smyrna (ii, 217; v, 112) fifty miles to the south, and took two years of a post-graduate course. Still dissatisfied with his knowledge, and with the repute of the University of Alexandria in mind, he made the six hundred mile journey and spent five years under the influence of the world renowned Egyptian Museum or Temple of the Muses (ii, 217; vii, 635; x, 53 et seq.; xvii₁, 806).

Four of the five summers in Alexandria he suffered from an intermittent fever, due he thought to overwork and improper eating, though possibly a continuation of the condition which made him delicate as a child.

He returned home in the summer of the fifth year ill with what he diagnosed as an abscess between his liver and diaphragm (vi, 756), but what I believe was a right pleural effusion, because he became well on bleeding as suggested to him by Aesculapius in a dream (xi, 314; xvi, 222) apparently in the celebrated shrine of that god in Pergamum.[4]

After recovery he entered on his career at the age of twenty-eight (xiii, 599), having spent eleven years in medical schools. He was a brilliant and industrious student, and had profitted by every hour of this protracted course. As a consequence, within a year his repute was such that he was appointed to the important post of physician to the gladiators: important to him on account of its prominence and the associated practice of surgery, important to subsequent ages because it gave him a well-equipped operating room and animals without number to dissect and experiment on.

In Smyrna he had studied under Pelops, one of the two or three best known medical teachers in the empire. In agreement with his contemporaries the great Pelops incorrectly taught that the diaphragm alone controlled respiration and that the expansion of the chest walls was produced by the expansion of the lungs (II, 657). From frequent dissections Galen early recognized the additional action of the intercostal muscles. Taking up this investigation into the mechanics of breathing he learned so much that almost nothing remained to be added.

He described for us the diaphragmatic muscle, its innervation, and what happens when one and both phrenic nerves are cut. He was the first to note the obliquity and decussation of the fibers of the intercostal muscles and to explain the reason therefor, namely, that one part was active in the expansion, the other in contraction of the chest walls. He sectioned the nerves to the intercostals and watched the action of the diaphragm alone. Finally he showed the influence of the thoracic muscles (II, 660–680; III, 409 et seq.; IV, 465 et seq.).

The importance of this magnificent piece of work can scarcely be overestimated, yet while pursuing it he lighted on another discovery much more dramatic and interesting: I am referring to the nerve of speech.[5]

Sectioning one at a time each of the nerves entering the thorax to learn if it had an influence on breathing, he cut the recurrent laryngeal, and to his amazement the pig previously squealing became silent. Repeating the experiment on other pigs, and then on many other domestic as well as the wild animals of the amphitheater, like the lion, and even the long-necked crane and ostrich[6] with the result that their peculiar cry or utterance was invariably lost, he realized he had the nerve of speech which if cut or interfered with would prevent man from talking (II, 218; IV, 278; XIV, 629 et seq.).

This not only meant the discovery of the function of the recurrent laryngeal nerve, but practically the discovery of the function of the brain, since it was commonly taught to be for the cooling of the blood. The popular argument backed by the authority of the philosophers Aristotle, Chrysippus and Diogenes of Babylon was: we talk with the vocal cords, the impulse to their movement comes from the lungs, intelligence must be some place neighboring, and probably in the heart (V, 241).

In fact later in Rome, while he was promulgating this discovery, his opponents brought forward what appeared to them an absolutely clinching comparison (V, 245):

"Urine," they said, "is passed through the urethra by the compression of the bladder wall; words are passed through the larynx by the compression of the lungs,—it would be as logical to say that urine comes from the brain as that speech does."

Just as he had concluded these two remarkable investigations on the mechanics of breathing and the function of the recurrent laryngeal nerve, and in the midst of the peace and quiet of his charming native city was pursuing others of equal importance of which we will speak later, there was an uprising of the Parthians

(XIV, 622, 647, 648) under their new and enterprising ruler Vologeses III.

Proceeding from the interior of Asia the Parthians advanced to Elegia in Armenia where they annihilated a Roman Army of about 11,000 men[7] marching to intercept them. Elegia is 800 miles east of Pergamum, but with the principal Asiatic contingent of the Roman army destroyed, Asia Minor naturally became alarmed. The barbarians, however, instead of advancing on the cities of Pergamum, Smyrna, Ephesus and Rhodes, turned their steps southward toward Antioch, the Eastern Capital of the Empire,[8] and never came within 700 miles of Pergamum.

The uprising took place in March 161 A.D.,[9] and Vologeses' first success was practically speaking also his last, for although he actually moved his army almost to the walls of Antioch and took some of the lesser cities on the way, he got no further. In the meantime legions with more competent generals from Moesia, Pannonia, Noricum, Rhetia, Gaul, Britain, Italy and Africa began to pour by land through Asia Minor, and by boat through Antioch, and before a year had passed the danger to Pergamum and the other coastal cities was removed.

It was about six months later, in other words, somewhat more than a year and a half after the war began, and six months after the crisis had subsided that Galen made up his mind to visit Rome.[10] Pergamum was gaining in courage daily with the constant success of the Imperial troops, but conditions were far from normal. The activities at the beginning of the revolt in which he was glad to participate, had settled down to an established routine requiring but little intelligence. Their continuance, however, made it difficult to carry on other work, especially his beloved research. Now was the time to learn what was being done in the much talked of philosophical and medical schools of the Capital and he proceeded to take advantage of it. The very fact that he intended (XIV, 622) to return and did return, shows that he did not leave under discreditable circumstances.

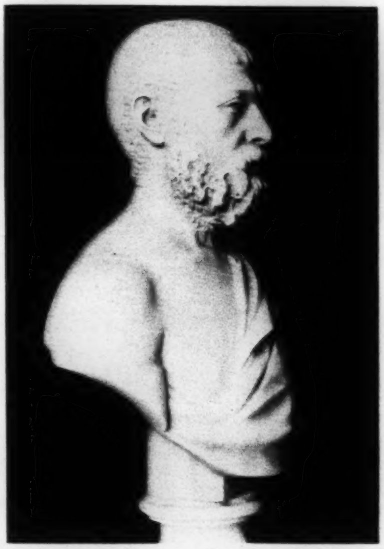
FIG. 1. PORTRAIT BUST OF GALEN IN PHILADELPHIA COLLEGE OF PHYSICIANS.

In spite of the fact, however, that Vologeses and his army never came within seven hundred miles of Pergamum, a thirty-five day march, it might still be asked why Galen did not enlist? To answer this requires only the slightest comprehension of military conditions at the time.

The standing army of the Empire was composed of thirty legions of Roman soldiers, which together with the auxiliaries impressed from the provinces amounted to over 300,000 fighting men.[11] Some of these were stationed in Italy, particularly in the Capital, but the great majority were distributed over the various frontiers. On every side beyond the Roman boundaries were barbarians, and the frequency of revolt can be seen from the fact that during the nineteen-year reign of the then Emperor, Marcus Aurelius, there was an uprising at different times of the *Britains,[12] Marcomanni, Quadi, Jazyges, Germans, Sarmatians, *Costobocci in Greece, *Egyptians and Parthians, not reckoning the rebellion of his most competent general in Antioch, who set himself up as Emperor. If an insurrection signified one was conscientiously bound to enlist, almost constant service would be the result, and it would be more satisfactory to become a professional soldier at the beginning. Even when an outbreak was critical it simply meant the temporary transference to the point of danger of legions from elsewhere.

On account of the frequency of war and the necessity sometimes of conscription, various professions were exempted by law, even in great emergencies. Among these were officials of government, priests, physicians,[13] philosophers, sophists and several other varieties of teachers. And all of them accepted their prerogative, except of course, those who wished to enlist in the regular army. For instance, the poet Lucian, who was only five years older than Galen, was at the time teaching in southern France. His parents lived in Samosata, on the line of march from Elegia to Antioch. Rushing across the continent to his native city he removed his relatives to Athens, but he did not enlist. His courage, however, has never been called into question, since standing almost alone in the face of intense superstition this classical poet atheist poked fun at all the religions of the world.

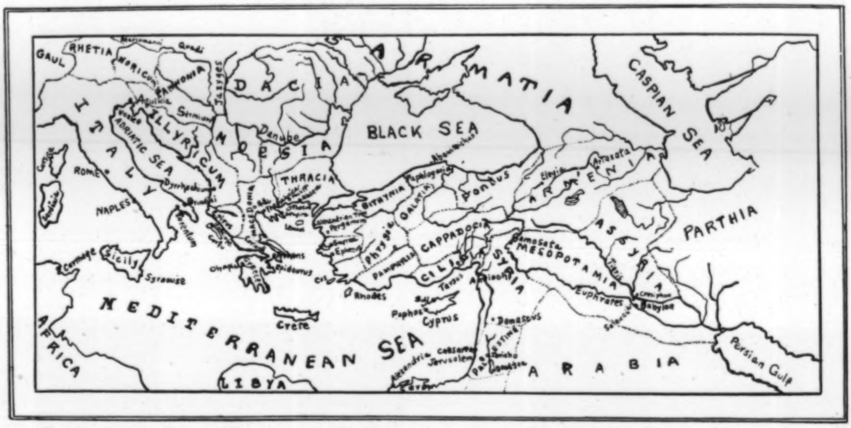

FIG. 2. PART OF THE ROMAN EMPIRE AND ITS SURROUNDINGS TO INDICATE THE PLACES MENTIONED IN THIS ARTICLE.

This rebellion against the Roman arms took place while Galen was in the midst of a further piece of work on the differentiation of motor and sensory nerves, and their location in the spinal cord (II, 684). In its later completed form this investigation stands the test of today, and was not added to for 1600 years till the work of the celebrated Charles Bell in the nineteenth century. This research was now brought to a standstill.

With his broad scholarship he could not help but recognize he was bringing to light scientific knowledge of value to all future ages, and was accomplishing more in the extension of biology than all the rest of the world put together. Important as he had a legitimate right to deem himself he, nevertheless, remained in Pergamum for a year and a half, remained till all danger was passed and Vologeses was retreating with a Roman army of about 75,000 men[14] in active pursuit.

He then, as I previously stated packed up and retired to Rome (XI, 299; XIV, 648). He went not into hiding but to the actual seat of government from which the war was being conducted. Finding it difficult to continue his research, he went to the Capital with the idea of furthering his scientific knowledge by association with the intellectual lights about whom he was constantly hearing. On conclusion of hostilities when conditions became normal, he returned to Pergamum with the intention of taking up again the interrupted work. His continued regard for his native city, as manifested in later actions, shows that his reception was not as a coward or deserter, but as a distinguished citizen.[15]

Official Rome was at the time an Academy with the saintly Marcus Aurelius as head master, and at his feet consuls, prefects and senators earnest in their pursuit of virtue and philosophy. Into this Academy burst the brilliantly educated Galen, with a virtue equal to that of the renowned Emperor, with a biological knowledge and new discoveries in physiology which intrigued the philosophers, and with a prejudice against sectarianism which antagonized the physicians of the sectridden Capital.[16]

FIG. 3. MARCUS AURELIUS, THE MOST UPRIGHT AND CONSCIENTIOUS OF ROMAN RULERS. HE WAS A FRIEND AND PATRON OF GALEN, AND GAVE HIM MEDICAL CHARGE OF HIS SON COMMODUS, THE HEIR TO THE THRONE, WHILE HE WAS SIX HUNDRED MILES AWAY FIGHTING THE GERMAN BARBARIANS.

As in Pergamum, on his return from Alexandria, so now in Rome; within one year he was the most talked of man in the city. And the diversion produced by the opposition of the medical men to his new discoveries made half of officialdom, and three-quarters of the physicians forget for days at a time an actual war was waging on the frontier. In front of the book-stalls on the Sandalarium just to the north of the forum, in front of the apothecary shop on the Sacra Via to the east of the Forum, in the huge and magnificent baths of Trajan where they went to exercise and bathe each afternoon, and finally in the Temple of Peace which was the recognized Assembly Hall of Physicians, the medical men aided by the sophists wrangled with

Galen aided by his pupils and the philosophers, until there was scarcely an intellectual person in the Capital, who was not taking sides, and until the very tufa blocks of the pavements must have been saturated with the dissensions.[17] And everywhere people smiled with amusement when they recollected that the Assembly Hall of Physicians was euphemistically called the Temple of Peace.

FIG. 4. LUCIUS VERUS, CO-EMPEROR WITH MARCUS AURELIUS AND COMMANDER OF THE ROMAN ARMY, WHICH BROUGHT THE GREAT PEST TO ROME AFTER GALEN HAD LEFT.

The physicians of Rome were at the time divided into the sects of dogmatists, empirics, methodologists, Thessalian methodologists, pneumatists, eclectics, Hippocrateans, Praxagoreans, Herophileans and Erasistrateans. It would appear that in Pergamum there were practically only two sects, dogmatists and empirics, with a small sprinkling of pneumatists. It is also likely Galen himself so dominated medicine in his native city that almost all followed his lead.

There were two sects in Rome which he properly and constantly condemns, the methodologist, and with added vehemence the Thessalian methodologist. The first he condemned principally for its silly notion that all diseases could be reduced to two, namely, diseases with a constriction and with a relaxation of the pores of the body.

The Thessalian methodologists went a broad step further. Since all diseases could be reduced to two, six months were all that was necessary for the study of medicine, and this school was turning out physicians right and left who six months before had been barbers, weavers, shoemakers and clerks. In view of Galen's conviction that it was necessary for him to study eleven years, it is not difficult to imagine his feeling toward Thessalianism. And with a courage that cannot be too highly commended, considering how numerous this sect was in Rome, he denounced it day in and day out, and with Thessalians within hearing called their founder, who in his entire behavior is strongly reminiscent of certain founders of sects today, impudent, insolent, stupid, barbarous and asinine (x, 7 et. seq.).

Raging with passion they retaliated that his remarkable prognoses were made not through a knowledge of medicine, but an evil knowledge of divination, that his wonderful cures were made not by drugs, but by magic. Sorcerer they called him, and magician (XIV, 615), but it was not possible to call him coward.

Not a few commentators, having only Galen's addresses in mind, without taking into account the educational conditions he was berating, consider he went greatly to excess. With the high-class empirics and methodologists, however, tainted with a skepticism,[18] or more nearly a nihilism in regard to learning and research, and the low-class methodologists insisting that all medicine could be learned in six months, excess was impossible. At most Galen's attitude was the natural extreme of the reformer who in his anxiety to correct is unconsciously carried beyond the goal.

Confronted with the idea that knowledge was a bauble and education futile, that research in anatomy and physiology added nothing to medicine, he pleaded day after day for study, and then more study, for experiment, and then more experiment.

From this time comes the sentiment which he frequently repeats: The road of investigation is long and arduous, but leads to truth; the road of assertion is easy, but leads nowhere.[19]

The friends who stood by him in these discussions, without whose influence he would possibly have been assassinated by the Thessalians, were Barbarus, the uncle of the Co-Emperor Lucius Verus; Sergius Paulus, one of the two consuls; Flavius Boëthus, an ex-consul, and later appointed Governor of Palestine; Claudius Severus, one of the philosophical teachers and the closest intimate of Marcus Aurelius; and Adrian, at the time assistant to the philosopher Boëthus, and later the most popular orator in the Roman Empire.[5]

If Galen left Pergamum under discreditable circumstances, especially under the stigma of cowardice on account of failure to enlist in the war, he would assuredly not have chosen as the place of his exile the Capital of the Empire, from which the war was being conducted; he would assuredly not have put himself into prominence by opposing most of the Roman physicians, many of whom had the ear of the court and the authorities. Laboring under the odium of deserter he would not have been received and extended the hand of friendship by the highest imperial officials.

Few men when actually put to the test have the courage to sacrifice worldly interests to ideas. Galen not only sacrificed the friendship of the medical men, among whom he hoped to promulgate his great discoveries, but even put his life in jeopardy at the hands of the low-principled Thessalians. For in spite of his friend Eudemus' assurance that there were no depths of villainy to which the sectarians in Rome were not willing to descend, even murder (XIV, 623), since ten years before a physician acting similarly had been thus disposed of, Galen stopped only for a time his antisectarian addresses, and then continued them till he died.

We know of twenty-three[17] articles from his pen against sectarianism, the majority transcripts of lectures delivered in Rome. In these he minced neither words nor phrases. When his opponents became vituperative he followed suit, not dissimilarly to Origen, Tertullian, Sylvius, Vesalius, Pasteur, Metchnikoff, Roosevelt and innumerable others.

Yet the enmity of the physicians preyed on his mind, and after his powerful friend Boëthus left the Capital to take up his governorship of Palestine, Galen deemed it wise to cease temporarily participation in public discussions and devote himself solely to practice. He also renewed his resolve to return to Pergamum as soon as conditions became sufficiently normal to take up again his research (XIV, 622, 624).

This was his state of mind when in July, 165, about six months before he left Rome, while wrestling in the gymnasium of the bath, he suffered an upward dislocation of the acromial end of the clavicle (XVIII$_1$, 401). Both he and his surrounding friends, among whom were several physicians, as well as the wrestling master, believing it a dislocation of the head of the humerus downward, endeavored to reduce it. Before the nature of the injury was recognized such damage had been done to the tissues by their efforts, that he had a long and painful convalescence.

Embittered by the enmity of the medical men, disconsolate at what he considered his failure to promulgate the new discoveries of which he was so proud, physically and mentally exhausted by the foolishly tight bandage in which his arm had been slung over forty days, ennuied on account of his non-participation in public affairs after giving up visiting the Temple of Peace, he looked forward day after day to the time when he could end the bickering he detested and return to the research he loved so much.

Eventually the day came. The war was finished. The articles of peace were signed. Lucius Verus, the Commander, was on his way back to Rome. Full of elation at the prospect, he was dreaming of departure when a new complication arose, highly complimentary in one way, mentally upsetting in another.

His friends the philosophers, many of them officials or intimates of officials about the court of Marcus Aurelius suggested him for a government position (XIV, 648).[20] Flattering though it was Galen was in no humor to accept, and he requested they do nothing further until he saw and talked with them again. Convinced after consideration that they would pay no attention to his wishes, but would have him appointed regardless, he packed up hastily and made overland for Brindisi. To several knowing of his departure, he said he was in need of a rest and was going to Campania (the country around the Bay of Naples). He did not, however, stop at Campania, but went through to Brindisi and took the very first vessel crossing the Adriatic. From the brief history here given, it must be evident that the thrill of the boat as it was loosed from the wharf produced the first real relief from weariness and vexation of spirit experienced over many months.[21]

This departure, he definitely states in a work written thirteen years later, took place shortly before the Commander-in-Chief Lucius Verus returned from the East. Quoting his exact words we read (XIV, 648, 649): "When I understood the war was ended I set out immediately from Rome . . . Not long after Lucius Verus returned." Since the triumphal entry of this Commander and his victorious army into Rome occurred in March 166,[22] it is evident Galen withdrew before this time.

Unconsciously to the departing Pergamite the glance he threw back at the gradually receding Capital as he sped down the Via Appia to Brindisi, was the last view by a historical personage of Rome at the height of its splendor[23] for Lucius and his all-conquering army brought back something else in addition to victory.

Accompanying them along the line of march from Babylon[24] in Central Asia through Syria, Asia Minor and Greece,[25] and even into the Capital itself stalked the ghastly figure of pestilence. Seeded along the way it spread throughout the Empire and produced a holocaust.

This is the epidemic which the historian Niebuhr associates in a causal fashion with the initiation of the decline and fall of the Roman Empire. It is considered to have carried off twenty-five million of its hundred million population.[26] Becoming known soon after as the Great Pest, it furnished a landmark in the life of every citizen, an unforgettable time from which to date all happenings. It broke out in Rome sometime between the spring of 166 and the spring of 167, but all authorities agree that it was at least after Lucius Verus' return.[27]

After narrating in the work written thirteen years later that he left before Lucius Verus and his army returned from the East (and therefore before the pest broke out in the Capital), Galen states in another work written thirty years later (XIX, 15), "having sojourned three years in Rome, the great pest beginning, I hastily set out from the city, going eagerly to my native country."[28]

This sentence is one of the most frequently quoted in biographies,[29] scarcely any biographer, even in the shortest sketch[30] failing to notice it, and all insist that he ran away from the epidemic. In the light of our actual knowledge of the circumstances, it is quite amusing to read some of the accounts of his departure from Pergamum and his later departure from Rome. It would be even more amusing, except they have proved so tragic for the reputation of one of the most courageous of physicians, and are the cause of some of the present-day ill-feeling against him.

From what we know, the statement is plain: he remained three years in Rome, he hastily and eagerly left because he was weary of the Capital and its wranglings, and wished to avoid refusing the public office his friends were soliciting for him. He left at the time the great pest was beginning, that is at the time it was spreading over the Empire, though it had not yet reached Rome. That it was coming to Rome he had no more idea than we had that the influenza epidemic in Europe in 1918 was coming to the United States and would cause its desolating havoc. The statement could not be plainer. He left Rome where the epidemic had not yet begun and no one expected it, and actually went into the regions where it was already a menace.

Unacquainted with the surrounding circumstances, his detractors interpreted his statement to mean: Having sojourned three years in Rome, the great pest breaking out I hastily and eagerly left the city in order to avoid it. Nothing can be further from the truth, and the previous narrative, as well as the actions of his entire life can be marshalled against it.

In an earlier part of this article I showed Galen standing up against the medical profession of Rome in the endeavor to inculcate ideas necessary to the progress of medicine. His display of courage is almost unique since he even went so far as to jeopardize his life at the hands of the uneducated and unprincipled Thessalians.

In addition he was a pious Pagan, and an ardent follower of stoicism which demanded the most rigid uprightness, regardless of danger or harm to self. His life was consecrated early to Aesculapius, and to the end of his days he never wavered in his devotion. Almost no work of importance came from his pen without containing the name of this patron and an expression of his homage. No matter to what friend dedicated, it was inscribed also to the god of medicine. And not without results. In his pagan piety Galen saw the hand of Aesculapius helping him over rough and perplexing places many times (III, 812; X, 609; XI, 314; XVI, 222; XIX, 19).

In his work on "Hygiene," written about the age of forty-six (176 A.D.) he says (VI, 308): "I have never shirked duty even when hard, but have done my utmost, watching patients when necessary even throughout the night, sometimes for their sake, though sometimes also merely for what I could learn."

About the age of sixty-three he tells us (V, 42 et seq.)[31] of the virtues enjoined by his father forty-four years before: Justice, temperance, fortitude and prudence; to despise honor and glory, to seek only truth and to fear no danger. These I have followed, he says, to the present day. And a study of his career brings forth no reason for doubt.

In confirmation we know that two and a half years later, in the fall of 168 A. D., when the epidemic was raging among the troops on the German frontier, where a new war was in progress, Marcus Aurelius who was in command sent to Pergamum for Galen. Two reasons naturally occur to us for this action, the high regard the Emperor had for his work in Rome, or special success in the treatment of the pest in Asia.

Shortly after his arrival at the Camp, a very severe winter setting in, the army with the physician in its train returned to the Capital. Here the Emperor put the Pergamite in charge of the little Prince Commodus for the next six years, while he himself was six hundred miles away fighting the German barbarians.

No ruler in history surpasses Marcus Aurelius in love of virtue, resolute courage and devotion to duty. It is unthinkable that he would engage as a caretaker for his beloved son a physician so deficient in character and philosophic stoicism as to prove a deserter in time of danger. No! This appointment alone demonstrates the esteem in which the Pergamite was held in the Capital, not only for his knowledge of medicine, but for his qualities as a man.[32]

REFERENCES

1. He was born in September, 130 A. D. See, WALSH, J. Date of Galen's birth. ANN. M. HIST., n. s., 1: 378–382, 1929.
2. In spite of the fact that the uprising Galen speaks of he very definitely describes as the great Parthian War of the period, it is astonishing how many modern detractors got the idea it was a local sedition or revolt in the town of Pergamum itself.
3. The figures in parenthesis refer to the volume and page of the handiest and best known edition of Galen's works, namely, Kuhn's "Galeni Opera Omnia," Leipzig, 1821.
4. In the hospital-like wards of this shrine, the Mecca for the pious sick of the empire, could be found statesmen, philosophers, sophists and merchants awaiting the heaven-sent directions of the god. The broadest education, even of scientific investigators like Galen, deemed the cures too frequent to be doubted. Impressed as he was, the fact of his return from Alexandria at this time and the dream make it likely that finding himself seriously ill, he came home for the express purpose of visiting the temple and believed himself rewarded.
5. PRENDERGAST, J. S. The background of Galen's life and activities, and its influence on his achievements. *Proc. Roy. Soc. Med.*, 23: 1131–1148, 1930; also

Walsh, J. Galen's discovery and promulgation of the function of the recurrent laryngeal nerve. Ann. M. Hist., 8: 176–184, 1926.

6. Simon, M. Sieben Bucher Anatomie des Galens. Leipzig, Hinrichs, 1906, 2: 78 and 188.
7. Paul Barron Watson in "Marcus Aurelius Antoninus," N. Y., Harper, 1884, p. 63, says an entire legion which would be about 7,000, or with its auxiliaries, about 11,000. Charles Merivale in "History of the Romans," N. Y., Appleton, 1875, 7: 455, says one legion. B. G. Niebuhr in "Lectures on the History of Rome," Ed. 2, London, Taylor, Walton and Maberly, 1849, 3: 250, says one or two legions.
8. Watson. *Op. cit.*, pp. 64, 139.
9. Watson, *op. cit.*, p. 63, says immediately after the accession of the Co-Emperors Marcus Aurelius and Lucius Verus which was on March 7, 161, and pp. 150, 151, that Lucius Verus, the Commander-in-Chief of the Roman forces returned in March, 166, after the war was finished having been absent from Rome nearly five years. Niebuhr, *op. cit.*, p. 250, states, commencement of reign of Marcus Aurelius. Merivale, *op. cit.*, p. 455, asserts, the Parthians seized the moment of a change in the succession of Emperors.
10. He tells us he came to Rome at the age of thirty-two (xviii$_1$, 347); he tells us again that he remained in the Capital three years (xix, 15) and left it not long before the Emperor Lucius Verus arrived from the East (xiv, 649). Lucius Verus made his triumphal entry into Rome in March, 166. Allowing anything within three months to be included in Galen's term "not long before," then he left about, or after January 1, 166; and if he remained in Rome three years, he arrived about January 1, 163, or more than a year and a half after the Parthian War had begun.
11. Gibbon says 375,000 "History of the Decline and Fall of the Roman Empire," N. Y., Burt, I: 236.
12. Those marked with an asterisk were quite insignificant, but the remaining six were very serious.
13. Since there was no medical practice act in our sense of the term, anyone feeling so inclined could call himself a physician. Not all such, however, enjoyed the privileges of freedom from conscription, immunity to certain taxes, etc., but only a well-defined limited number in each city or town holding specified public offices. These corresponded more or less with our health officials who watched over sanitation, took care of the poor, free or for a small fee, or were sufficiently highly regarded to hold the positions of physician to the gladiators, dramatic theaters, temples, vestal virgins and certain public associations. Unnecessary to say with the privileges were associated definite obligations. Galen was exempt as physician to the gladiators, but also likely as a teacher.
14. Watson. *Op. cit.*, p. 142.
15. This is particularly shown by the fact that though he was afterwards called by Marcus Aurelius to the German War, and accompanied him from Aquileia to Rome where he remained ten years, he did not remove his library to the Capital (xix, 34), since he still desired, and expected to return again to his native city.
16. Physiology, and even anatomy, belonged at the time to the study of philosophy rather than medicine. It is on account of accomplishments in these branches that he became known as a philosopher as well as physician. The medical men rose against him not only on account of his antisectarianism, but because he insisted on making anatomy and physiology a requirement in the study of medicine. It may be said, though the majority of physicians were opposed to him, he had a small following, and though the majority of philosophers were friendly, a few were not (xiv, 650).
17. Walsh, J. Galen clashes with the medical sects at Rome. *M. Life*, 35: 408–443, 1928.
18. Patrick, M. M.: Sextus Empiricus and Greek Skepticism. Cambridge, Deighton Bell & Co., 1899; also The Greek Sceptics, N. Y., Columbia Univ. Press, 1929.

19. This generalization is expressed by Galen in almost every book of his "Dogmas of Hippocrates and Plato," and the "Use of the Parts." Succinctness not being one of his virtues, as is shown by his twenty-one volumes of literary legacy, it is always expressed at great length and not in my epigrammatic form.

20. He gives us no idea as to the nature of this position. Archiater (corresponding with that of our Surgeon-General) has been suggested, but this is doubtful.

21. Speaking to his friend the peripatetic philosopher Eudemus, Galen says (XIV, 622):

> What I have resolved you have often heard, namely, to make in Rome only a brief stay, and when the revolt in my fatherland comes to an end depart in order to avoid further association with these unscrupulous rascals [meaning the Roman physicians].

Later in connection with a mention of the Emperor Marcus Aurelius, he tells us (XIV, 647): "At this time Lucius Verus was absent from the city on account of the Parthian War, which was being carried on by Vologeses." The Co-Emperor Lucius Verus was Commander-in-Chief.

Still later he states (XIV, 648):

> Understanding the desire [of my friends] in regard to the honor they were soliciting for me, and fearing lest their action would prevent my return to Asia, I asked them to defer it for a time. When I learned that the war was ended I set out immediately from Rome going to Campania. I proceeded thence to Brindisi where I resolved to take the first ship going either to Dyrrhachium or to Greece, fearing that some of my friends in power, or even the Emperor himself, hearing of my departure, a fugitive as it were, might send an officer to order my return. After one day in Brindisi I sailed to Cassiope [the principal city on the Island of Corfu, midway between Brindisi and Greece] . . . Not long after Lucius Verus returned.

Comparing these three quotations, it is evident from the first that he left Pergamum on account of a revolt, and from the other two that this revolt was the Parthian War begun by Vologeses, the ruler of the Parthians. From the first and third it is evident he left Rome on account of the enmity of the physicians, and left hastily to avoid the official position about to be thrust on him.

22. Watson, *op. cit.*, p. 151, says "towards the end of Winter 166," which would make it at least not later than March.

23. On Galen's return three years later in the cortege of Marcus Aurelius the decline was already in progress, and from this time it sank till the period three centuries later when it had become a wilderness though a wilderness of marble, with only 500 people within its almost totally demolished walls (Procopius quoted by Gregorovius, Rome in the Middle Ages, George Bell & Sons, 1894, 1: 433).

24. Capitolinus (cited by Watson, *op. cit.*, p. 158) tells us the epidemic began in Babylon, where one of the Roman soldiers broke open a golden casket in the Temple of Apollo, and there arose from it an exhalation producing the plague, which spread at once through Parthia and the entire world. He goes on to say that the disease was an infliction of the gods as retribution for the General Avidius Cassius' breaking his sworn promise to the citizens of Seleucia when they surrendered.

25. NIEBUHR. *Op. cit.*, p. 251.

26. Merivale, *op. cit.*, p. 463, says "it so devastated the whole of Italy that villas, towns and lands were everywhere left without inhabitant or cultivation, and fell to ruin or relapsed into wildernesses." An epidemic which historians believe to have been the same disease returned twenty-two years later (189 A. D.) during the reign of Commodus, causing a loss of life not dissimilar. The two visitations are sometimes considered as one epidemic, and it is probable the twenty-five million deaths constitute the sum of both.

27. Simonde de Sismondi, "Rome," London, Longman, Rees, Orme, Brown, Green & Longman, 1835, 2: p. 203, states that the pest was brought by Lucius Verus from the East. Eutropius (trans. by Rev. John S. Watson, London, George Bell & Sons, 1902, p. 510) says it arose after the victory over the Parthians. Niebuhr, *op. cit.*, p. 251 asserts: In A. D. 167 the real oriental plague was carried into Europe by the army returning from the Parthian

War, and spread all over the western world, Asia Minor, Greece, Italy and Gaul. Watson, *op. cit.*, p. 158 says, the pest broke out in 166, not indicating whether he means in the East, or in Rome, though he possibly means the latter. J. B. Bury "History of Rome," New York, Harper & Bros., 1893, p. 541 declares "the plague was carried to the West by the legions who returned with Verus."

Even better evidence than any of the foregoing appears to me the fact that the triumphal procession of Marcus Aurelius and Lucius Verus in the spring of 166 A.D. was one of the most elaborate (Watson, *op. cit.*, p. 151) ever seen in the Capital. It is scarcely possible this could be so with a great epidemic in progress, and hence it must have begun later.

Merivale, *op. cit.*, p. 463, affirms, "it was still raging when the emperors left Rome for the war against the Germans in 167," which would point to its beginning late rather than early in 166.

28. This statement is made in a catalogue of his works which he compiled at the age of sixty-eight on the request of a favorite pupil. He is speaking of the books written in Rome, and then of the later work he did in Pergamum. At the conclusion of the quoted sentence there is a period followed by the word *μηδενὶ* and then a lapse in the text succeeded by a change of subject. It is useless to speculate whether or not this statement was explained in the lapsed part, because his pupil Bassus knew all the circumstances as well as we do, or even better, without explanation.

29. CHARTIER, R. Vita Galeni in the Charteriana edition of Galen's Works, Paris, 1638; NEUBURGER, M. History of Medicine, tr. by Ernest Playfair, London, 1910; FIGUIER, L. Vies des Savants, Paris, Hachette et Cie, 1870; SINGER, C. The Evolution of Anatomy, N. Y., Knopf, 1925; and WRIGHT, J. The Man Galen and His Times, *New York State J. Med.*, 114: 557–562; 677–682, 1921.

30. HUTCHINSON, B. Biographia Medica, London, Johnson, 1799; ROBINSON, V. Pathfinders in medicine, Galen and Greek medicine. *M. Rev. Rev.*, 18: 775, 1912, and THORNDIKE, L. Galen, the man and his times. *Scient. Monthly*, 14: 83–93, 1922.

31. For the time at which his various works were written see Johannes Ilberg, Ueber die Schriftstellerei der Klaudios Galenos, Rheinisch. *Museum f. Philol.*, 44: 207, 1889; 47: 489, 1892, 51: 165, 1896; 52: 591, 1897.

32. Opinions in regard to the nature of the Great Pest are at variance. Since Galen followed a special classification of diseases corresponding to the existing knowledge, his description is insufficient for accurate diagnosis, though he mentions it innumerable times and treated many cases. The reason is easily explained.

On coming to Rome he found the commonest classification to be that of the Methodologists who divided all internal diseases into two, strictum and laxum, diseases due to the minute canals of the body being too constricted or too relaxed. This he was unwilling to tolerate and argued against it throughout life. With the desire for simplicity in the air, however, the most he could accomplish was improvement. He separated many diseases, yet continued to include a variety of others under special heads.

Under the classification "Ulcers of the lung" he included tuberculosis, abscess, pneumoconiosis, bronchiectasis and all conditions associated with protracted cough and expectoration, especially if they manifested hemoptysis. Some cases of the pest showing blood-spitting, he gives us in a discussion of pulmonary ulcers a description of two (x, 361 and 367). From these we derive the following symptomatology:

Pustules appeared over the whole body accompanied by fever and sometimes by vomiting and diarrhea. If the pustules broke, which occurred about the ninth day there was a better chance for recovery. Involvement of the respiratory tube associated with soreness, cough and expectoration of little crusts about the tenth day sometimes occurred and these cases likewise showed a good prognosis.

In another place (III, 186) he also mentions gangrene of the feet as an occasional accompaniment.

Again in a discussion of drugs (XII, 191) he tells us:

> During the great pest which showed the same characteristics as that memorialized by Thucydides, practically all the patients who used this remedy [Armenian bolus which he describes, XII, 189] became rapidly well; the remainder who derived no benefit gradually succumbed because they likewise found nothing else capable of helping them. Hence we may conclude that when it was not effective the patient was incurable.

It is popularly believed the Thucydidean pest was smallpox.

Osler in "Principles and Practice of Medicine," N. Y., Appleton, 1909, p. 112, believes the Galen epidemic was smallpox; Councilman, in Osler's "Modern Medicine," Phila., Lea Bros., 1907, possibly smallpox; Immermann in Nothnagel's "Encyclopedia," Phila., Saunders, 1902, denies it was smallpox, but expresses no opinion in the way of diagnosis. Neuburger, *op. cit.*, p. 247, states the epidemic lasted about fifteen years and its manifestations chiefly resembled smallpox or dysentery. Niebuhr, *op. cit.*, p. 251, without good grounds says, more or less offhand, that it was oriental plague; Arthur Shadwell, in the "Encyclopedia Britannica," and many others, insist it was not bubonic plague. Personally from Galen's description, I am inclined to agree with Osler that it was smallpox.

GALEN*

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BURTON, he of "The Anatomy of Melancholy," writes: "We can say nothing but what hath been said, the composition and method is ours only. Oribasius, Aetius, Avicenna, have all out of Galen, but to their own method; different styles, but the same reliability." I, likewise, can say nothing new about Galen, because he has been written about for eighteen hundred years, by many men of many kinds: geniuses, intellectual humbugs, who climbed to fame on the ladder of his knowledge and ignorance, talented men, who added to the store of medical knowledge, and simple, but honest, learned blockheads. That men of such different types have written about him, shows the wide appeal he has made, and thus indirectly proves his importance. Further, I must confess, I have read much more about Galen, than in Galen's own works. If, then, you hear echoes of Haeser, Sudhoff, Charles Singer, Garrison, A. J. Brock, and a few others, do not severely blame me, but be glad I have chosen such scholars to crib from. My purpose is to show how I, a modern, interested in the history of science, and who believes we can only understand the present by knowing the past, react toward Galen, and to try to draw a picture, showing what manner of man he was, and why he was not otherwise. Galen, (the name Claudius, he owes to his editors, not to himself or his family) who, all unconsciously, summed up and closed the book of Greek medical science, opened, and largely written by Hippocrates, was born in Pergamus, in Asia Minor, about 130 A.D. He himself said, he was thirty-eight years old when Verus died in 169. If he spoke accurately, and not carelessly, this would make 131 his birth year. Some writers claim it was 129. Pergamus was no unimportant city. It was one of the chief centers of the worship of Aesculapius, possessed a great temple dedicated to Zeus, was an early focus of Christianity, the seat of one of "the Seven Churches," and, most wonderful of all, it was, according to the Book of Revelations, the place of "Satan's Seat." Zeus, in St. John's belief, (I believe he is still accepted as the author) was Satan, but whether some theologic quarrel, or damned heresy, also influenced him, in giving such black immortality to the city, I do not know. But it survives, and shows today no more signs of Satanic influence than most towns, and less than many. Perhaps Satan has moved a few thousand miles west.

Galen's father, Nicon, was a man of substance, virtuous in the Roman, manly sense, learned in philosophy, astronomy and geometry, and skilled in his profession, architecture. His mother, though virtuous, had an acid tongue and a bad temper (she punished her maids by biting them, and sometimes bit when no punishment was deserved) and took Xanthippe for her model, especially in her treatment of her husband. Temper and tongue were inherited by the son, but in less degree. He was a quarrelsome man, as is shown in his writings, had no sign of an inferiority complex, and was industrious and ambitious. His intellectual talents he inherited entirely, so far as we know, from his father.

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* Read at the Galen Memorial Meeting, Philadelphia College of Physicians, October 23, 1930.

We know nothing of Galen's ancestry, and only the little about his parents I have stated. The ancients seem to have had little interest in the study of heredity, or rather, regarded it as so self-evident, as not to require proof. They were more interested in knowing what men did or thought, than in the why or how. Psychology, as we think of it, the study of mind as revealed by behavior, and its causes, hereditary and environmental, was unborn until almost the other day. Galen had biologically good parents, though today some psychologists would claim endocrine imbalance in his mother, and had there been Freudians in those days, they would have loved to psychoanalyze her, and to attend to her libido. The mental environment of his childhood and youth, the atmosphere in which he lived, save his mother's vicious temper, was excellent; the material was such as to make possible every purchaseable advantage. He had good teachers, as a boy and young man, and was well grounded in Aristotelian and other philosophy. He studied under Stoics, Academics, Peripatetics and Epicureans. Apparently, he was led, when about seventeen years old, to study medicine, by a dream his father had. His interpretation of it was not by Freudian methods, but, accepting the correctness of his premises as to what dreams are, was more useful than Freudian interpretations usually are, and, of course, was based on a cleaner psychology. He travelled much while a student, indeed through his life, and had eminent teachers in Smyrna, Corinth, and at last in Alexandria.

I am going to recall to you an incident of Galen's time, though he was not in Smyrna when it happened, because it illustrates the ferment which had already begun to work in the minds of people, and the unrest, both civil and religious, present throughout the Empire. I refer to the martyrdom of Polycarp. A great public festival was being held in 155. Christian persecution was widespread. Bishop Polycarp, who was a connecting link with apostolic times, and a great upholder of the true faith, undiluted by those terrible things, heresy and false doctrine, was brought before the proconsul, as a result of the tumultous rioting, arising from the celebration, and was asked by him to abjure his faith, to save his life. He replied, "Eighty and six years have I served Him and He hath done me no harm. How then can I speak evil of my king who saved me?" The mob demanded the life of Polycarp and got their wish, but whether Galen heard of the incident we do not know. He would have paid little attention to it, just as, I suspect, we would, under similar conditions, but it illustrates the nature of the time in which he lived, and that influences every man, not only consciously, but unconsciously.

Alexandria, where he ended his student days, was a great center of learning and trade: it fed the bodies of the Romans with grain, and the minds of all men with science and learning. All races met there, and philosophers of all schools studied, thought, taught, discussed, dreamed, and quarreled. He must many times have seen the monument called Cleopatra's needle, now in New York, and its companion, now in London. He may have meditated, sitting in their shadow. In Alexandria, he had opportunity to study the bones of the human skeleton. He also learned Latin, Persian and several other languages. He remained there several years, and returned to Pergamus to practice, when twenty-eight years old. Soon, he was officially put in medical charge of wounded gladiators. He did well, especially in cases of nerve injuries, but, some time later, there were serious riots in the town, and he, never a courageous man, fled to Rome. Arrived there, he largely gave up surgery, and devoted himself to medicine. He was successful and, as frequently happens, success brought with it enmity, envy and hate. His enemies called him theorist, a surgeon with his tongue, rather than with his hands and head, and even claimed he was a sorcerer, making some of his cures, and, apparently, he made great cures, by black magic. He was not in sympathy with magic and magicians. Astrology also, which was a fundamental belief of the older stoics made no appeal to him, and he says, that in his time in Rome the people only bothered about it in forecasting legacies. I suspect the populace sought astrological advice as to lucky days. The populace remain the same today. Even if Galen had not been a conceited and quarrelsome man, he would not have had a peaceful time in Rome, because medicine was on its way toward intellectual chaos there, and almost every physician fought bitterly the members of rival schools. There were many schools: Methodists, Dogmatists, Pneumatists, Eclectics and others, all calling each other names, and few of the members of any school were really skilled. Open quackery flourished even more than today. Given then, a man learned in philosophy, learned and skilled in medicine, eager to continue learning, a talented mind, the reverse of modest, ambitious, and above all successful, quarreling was inevitable. He joined no school and was a real eclectic, taking knowledge wherever he found it. The quarrels, coupled with a plague which was ravaging Italy, led to his leaving Rome again and returning to Pergamus, which had once more become quiet. Later the Emperors Marcus Aurelius and Lucius Verus, knowing his great talent, sent for him. He, obedient to imperial orders, went. They meanwhile left Aquilia, where they had been, on account of a plague, and Verus died on the journey, and Galen returned to Rome. Soon after Marcus Aurelius requested him to go with him as a physician, on a military expedition against some German tribes. He did not wish to go, and, opportunely, had a dream in which Aesculapius appeared and told him to remain in Rome. He related the dream to the Emperor, who accepted it as a sufficient reason, and ordered Galen to remain in Rome and to take medical care of his son Commodus. During this period, an unfortunate accident happened. Galen gave lectures on anatomy at the temple dedicated to peace, and also had deposited there many manuscripts of his writings. The temple caught fire and the papers were burnt. His reputation continued to grow, but also the hate and envy of many doctors, and he left Rome. Of his later years, we know little. There has been much dispute as to where and when he died but he certainly was dead by 200 A.D.

So much for the externals, the

events, in Galen's life. Now let us take up his work, to try to discover what kind of man he was. He had a Greek mind, was credulous, but not, considering his age, superstitious. The man whose medical writings influenced Galen most, Hippocrates, cared little for theory, for philosophy, was practical-minded and not philosophical. Galen had from youth on studied Aristotle, and was greatly influenced by his writings. Hippocrates and Aristotle were Galen's two intellectual masters: they did not nullify, they supplemented each other. He had a hunger, which Aristotle fed, for seeking the reason of things. Also Aristotle's belief that there was a God behind all things, and that the universe was designed, not merely the result of the accidental clashing of atoms in space, as the stoics believed, appealed greatly to Galen. Nature, to him, was an artist, with God behind and controlling it. Had he reappeared in the world in the early nineteenth century the Bridgewater treatises, written to prove design, would not only have appealed to him, but he would have understood the point of view, just as quickly and just as sympathetically as he would, for other reasons, have appreciated the work of Harvey on the circulation of the blood.

Let me recall (I trust it will not bore you) the theories underlying Galenic medicine. I borrow, for this purpose, from that mine of now useless and forgotten, but ever interesting medical lore, Dr. James' "Medical Dictionary," published in three huge folio volumes in 1743 to 1745. Even as late as that date, Galen is referred to, and quoted more frequently than any other man. James, and the physicians of his time, of course, realized many of his errors, but still his spirit had profound influence. Galen accepted from Hippocrates the four humors: the blood, the phlegm, yellow bile and black bile, and the idea of hotness, coldness, wetness and dryness of these humors, e.g., blood was red, hot and moist, phlegm, white, cold and moist.

The body was made of parts, humors, spirits (*pneuma*). There were three kinds of spirits: (1) the natural, (2) the vital, (3) the animal. These three served as instruments of three faculties. (I need not remind you that by spirits he does not mean bodiless entities, but an essence pervading things.)

1. The natural spirit was subtile fluid arising from the blood in the liver. It presided over nutrition, growth and generation of the animal. It ebbed and flowed through the veins.

2. The vital arose in the heart and passing as a fluid through the arteries, it gave warmth and life to all the body.

3. The animal, the noblest, had its seat in the brain; reasoning depended on it and by means of the nerves the spirit gave motion and sensation and presided over all other faculties. (The animal spirits flow back and forth through channels in the nerves, which become obliterated in death.)

Now these three faculties produced three sorts of actions, the natural, the vital, the animal. These actions were again divided into external and internal.

1. Internal actions of the animal, imagination, reasoning, memory.

2. External: the five senses, general sensation and motion.

Internal actions of the vital faculty are violent passions, e.g., anger. External action, the pulsation of the arteries and movement of blood.

The internal actions of the natural faculty are blood making, concoction of food, and concupiscence. The external actions are the distribution of blood to all parts by the veins thus serving nutrition, growth, and preservation of the body and propagation of the species. A man was in health when the faculties performed their ordinary actions. Actions cannot be performed healthily unless parts and humors are healthy. If parts or humors are not acting well, the spirits run into disorderly motions and disease results.

Causation of disease.

1. External;
2. Internal.

External. Six: air, food and drink, motion and rest, sleeping and watching, retention and excretion, and the passions.

The *internal*, put in motion by the external, are of two kinds, (1) the antecedent; (2) the conjunct.

1. Depends upon a peccancy of the humors, with a plethora, or a bad state of one or more of them.

2. Is more closely connected with the disease itself and if removed cures it, e.g., in pleurisy the conjunct cause is the humor adhering to the pleura and causing the inflammation.

Though Galen knew that he knew nothing of the causes of many diseases, yet his therapeutics were based largely on his theories. But his greatness, as a mind, depends on other things altogether than his theorizing: on his work in experimental physiology and his anatomical studies, though his experiments were neglected for centuries. An excellent example of his work in physiology is his experiment to prove that urine enters the bladder by the ureters. I quote the account of it from Brock's translation. (Galen, "On the Natural Faculties.")

> One has to divide the peritoneum in front of the ureters, then secure these with ligatures, and next, having bandaged up the animal, let him go (for he will not continue to urinate). After this, one loosens the external bandage and shows the bladder empty and the ureters quite full and distended—in fact, almost on the point of rupturing; on removing the ligature from them, one then plainly sees the bladder becoming filled with urine.
>
> When this has been made quite clear, then, before the animal urinates, one has to tie a ligature round his penis and then to squeeze the bladder all over; still nothing goes back through the ureters to the kidneys. Here, then, it becomes obvious that not only in a dead animal, but in one which is still living, the ureters are prevented from receiving back the urine from the bladder. These observations having been made, one now loosens the ligature from the animals's penis and allows him to urinate, then again ligatures one of the ureters and leaves the other to discharge into the bladder. Allowing, then, some time to elapse, one now demonstrates that the ureter which was ligatured is obviously full and distended on the side next to the kidneys, while the other one—that from which the ligature had been taken—is itself flaccid, but has filled the bladder with urine. Then, again, one must divide the full ureter, and demonstrate how the urine spurts out of it; like blood in the operation of venesection; and after this one cuts through the other also, and both being thus divided, one bandages up the animal externally. Then when enough time seems to have elapsed, one takes off the bandages; the bladder will now be found empty, and the whole region between the intestines and the peritoneum full of urine, as if the animal were suffering from dropsy.

As said, his study of anatomy was made on Barbary apes and other lower animals, with occasional opportunity to examine human skeletons or stray bones. Dissection of the human body was forbidden throughout the Empire. He had opportunity to study the human skeleton in Alexandria. His account of the skeleton and its component bones is, therefore, the best of his purely anatomical work, though he regarded the teeth as bones. He never had opportunity (as far as I know) of studying human musculature in general. Using Barbary apes, he distinguished between the origins and insertions of muscles, and knew the function of many. His nervous anatomy was excellent. From the study of the brains of oxen, he distinguished the dura and pia mater, the corpus callosum, the third and fourth ventricles, with the aqueduct of Sylvius, the fornix, corpora quadrigemina, vermiform process, calamus scriptorius, hypophysis, and infundibulum. He knew seven pairs of the twelve cerebral nerves, and described the sympathetic ganglia, which he regarded as the reinforcers of the nerve. He was the first experimental neurologist. He proved that all nerves arise from the brain or spinal cord, and separated the sensory from the metor functions. He was the first to make experimental sections of the spinal cord, and knew the different results depending on difference in level. He caused aphonia by cutting the recurrent laryngeal nerve. He learned, by watching the heart of animals excised at sacrificial ceremonies, that it continues to beat when removed from the body and realized that this meant, its pulsation was not dependent upon outside mechanism. He made one observation on voluntary muscles, which gave him a very modern concept, that of muscle tonus as causing active posture. He had some notion of the reciprocal action of antagonistic muscles. He made some curious anatomical mistakes, many, if not all of which, were due to the fact that he studied not man's anatomy, but that of animals: e.g., the uterus, according to him, is two-chambered and he explained the sex of children by making the right testicle and right cavity of the womb the cause of male offspring.

I shall say nothing of his work on the eyes, and the theory of vision he accepted. Dr. Chance will tell you about it.

He, of course, knew nothing of the circulation of the blood, but had he been able to clear his mind of prejudgment, he might have made the discovery. He drew the conclusion that there was anastomosis between arteries and veins, because, as he writes, "If you kill an animal by cutting through a number of its large arteries, you will find the veins becoming empty along with the arteries; now, this could never occur if there was not anastomosis between them." Harvey never saw the link between arteries and veins, but wisely guessed it was there. Galen did not appreciate the importance of his conclusion. Again, Galen looked closely for the perforations in the cardiac septa (that the medical philosophy of his day claimed were there, thus explaining how blood got from one side of the heart to the other) but could not find them. He did not trust his own eyes as against dogma, but upheld dogma, explaining the pores were there, but too small to see.

He recognized phthisis as a disease and knew the therapeutic importance of climate and feeding, especially milk. (Parenthetically, let me remind you, the Romans paid much attention to hygiene, both public and private.) He differentiated pneumonia from pleurisy and was the first to describe aneurysm. He described what must have been encephalitis lethargica.

He was always (like his master in philosophy, Aristotle) hunting for the why of things, never content with learning the how. He was very modern in some things. Thus, he discusses the question as to whether structure follows or precedes function, a matter still discussed, and, I think the following quotation shows his opinion is that of most biologists of today, though his proofs belong largely to a now dead world. He writes:

> Thus man is the most intelligent of all animals, thus the hands are proper instruments for an intelligent being, since man is not wiser than the animals because he has hands (as Anaxagoras maintains), but as the judicious Aristotle asserts, he has hands precisely because he is the wisest. It is not by means of his hands, in fact, but through his reason that man learned the arts; the hands are an instrument like the lyre to the musician, like the tongs to a blacksmith . . . If we examine newly born creatures that strive to act before the parts of the body are fully formed, it becomes clear that it is not the parts of the body which excite the soul to be cowardly, courageous or wise. For example, I have often seen a calf try to gore before its horns had developed, a chicken try to spur although its feet were soft, and a little pig trying to bite without teeth; for every animal has in himself, without any previous instruction, an instinctive feeling of the faculties and functions of his body . . . It is not through instruction, I opine, that the eagle soars, the duck swims and the snake glides into a hole, for as Hippocrates says; Animal natures are untaught. Whence it seems to me, for the rest, that animals practice certain arts more by instinct than through reason.

What considered judgment can we pass on Galen? One thing makes a man, his heredity, another moulds him, if he is mouldable, his environment; the two combined give the final result. Galen's heredity was, all that we know of it, good; even his mother's bad temper may not have been an unmixed evil. The environment, so far as his parents willed it, was wise, and so far as he willed it, he accepted and chose all the good that came to him, in teachers and travel and work and study. The environment that could not be controlled, the time of living, the second century, the place, the Roman Empire, was not the best, but he seized all it offered. The second century A.D. was not an ideal time to develop men of science or men of art. Superficially looked at, the Roman Empire was still great, but already the seeds of decay had been planted. Roman citizenship was not made up of the little caste of former times, men of one race, one background, one tradition, but included men of different races and several levels of culture. In religion, the old gods were dead or dying; the new religion was struggling through a sad and perilous birth, and many of its midwives were far from wise, and some not virtuous. Economically, the growth of the Empire brought great wealth, to many who did not know how to use it, having no background, and this led to much evil. Rome was never the breeding ground of art and science, as Greece had been. Creature comfort was destroying the old Roman idea of virtue, and grafters and professional reformers were destroying statecraft. Malaria had already begun to undermine the people's health. Into this atmosphere Galen was born. Education and inherent tendency made him hold firmly to Aristotle and his God, who designed and rules the Universe. This colored, indeed controlled, his point of view toward life, science, philosophy. Accident seems to have made him a physician. Intellectual curiosity drew him to the study of the works of the great master of observation, Hippocrates, whose memory he revered even when he disagreed with, even contradicted his opinion. But, and it seems to me, his only real mental fault he got from someone in his ancestry, the craving for theorizing and hypothesizing. This craving may have been encouraged by some of his teachers of philosophy, not Aristotle, who was a great observer. He had to know, or think he knew, the why of things. Hence, sometimes instead of perceiving what he looked at, he saw what he wished to see.

He undoubtedly was the great physician of his period, though some of his contemporaries did not think so. World-wide fame came later, and grew with time. The Emperor Julian, (331–363) a great and honest man, who has been damned by all priestcraft since his time, because, when he reached maturity, he discarded the doctrines forced on him as a child and immature youth, helped him to immortality, by having Oribasius edit his many works. It goes without saying that the basis of Galen's fame and influence was his medical work, especially his system of therapeutics, but there was another factor, the church, as Singer points out. The church, especially in medieval times, helped to increase his fame, partly because the philosophy of Aristotle, which so greatly influenced him, could be largely accepted and adapted by it. The Arabs, who added little to science in their short period, and the scholarly Jews, accepted his teaching, and preserved his works in manuscript, when the Empire was destroyed and Europe so in chaos, so saturated with the idea that this life was but a way station between two eternities, so overwhelmed with the saving of individual souls, that all science ceased, save here and there in stray corners, where single scholars surreptitiously carried on. For centuries the human body was regarded as too contemptible to be worth study, but also too divine to dissect. Professors of anatomy were too dignified to soil their fingers. I do not wish to imply that the growth in power of church philosophy was the one cause of the cessation of growth of scientific knowledge. It was only one of many causes, but a potent cause.

Then came the Renaissance, thirteen centuries after Galen's death, and Leonardo da Vinci (Vesalius' forerunner) who probably never read Galen, but must have heard much of him, because all medical learning was still saturated with him, studied anatomy itself, and shortly after Vesalius made the great actual study of the human body. Paracelsus burnt Galen's books, as a symbol of getting back to nature. Humbug and charlatan as he was, yet a thinker and doer, I sometimes wonder if this act was not an honest one, and if he did not really mean, study bodies and not books, sick men, and not what writers say about disease. The dethronement of Galen began with Vesalius, because then his infallibility began to be doubted, but was not completed till Listerism won. Thus Galen's teaching, that suppuration was an essential part of the healing of wounds, and pus laudable, continued to be accepted through the ages, though a few preached against it, even in early times, Paracelsus, Paré and a few others, till Lister showed the medical world that all pus was evil. That was the end of Galenism, though even as recently as my student days, the word alterative was still used in the books on therapeutics as the name of one class of remedies, and an alterative is, in the old dictionaries, defined as a drug which alters the humors. But Galen still remains, and ever will, as the man who summarized all Greek medical thought, adding thereto a worthwhile portion of real discovery. It was not his fault that the world for centuries accepted his hypotheses and his therapeutics as final, but neglected to learn, and to use the greatest lesson he taught, the importance of experimental research.

SOME LANDMARKS IN THE HISTORY OF LEAD POISONING

By RALPH H. MAJOR

KANSAS CITY, KANSAS

PAUL of Aegina is frequently held up by the medical historian as an example of the low state into which the practitioner of medicine in the seventh century had fallen, because he frequently apologetically disclaimed any originality and because he constantly emphasized that the ancients knew all of medicine that was worth knowing and that he was merely their humble scribe. However, Paul has his good points. Few physicians, ancient or modern, have been so modest as to write seven books of medicine without claiming any originality, and Paul, despite his self-effacing attitude, did make some solid contributions to medical science. In his Third Book of "De re medica," he writes in a very interesting fashion about an epidemic of colic which prevailed in his time.

> I consider moreover a colicky affection, which still becomes violent from a kind of collection of humors, which took its origin from regions in Italy, moreover in many other places in Roman territory whence it spread like the contagion of a pestilential plague. Wherefore in many cases it passed into epilepsy, to some there came loss of motion with sensation unhurt, to many both, and of those who fell victims to the epilepsy, very many died. Of those indeed who were paralysed, not a few recovered, for the cause which attacked them ended by crisis.

This description is generally accepted as the first description of lead colic, since our author describes attacks of colic followed by paralysis of the extremities, sometimes with sensation unimpaired, at other times with involvement of both motion and sensation. So, whatever Paul's shortcomings, he has left us the first account of epidemic lead poisoning that we possess today. This, to be sure, may be only a description of what the Ancients also saw but their accounts have either not been preserved or are not as yet unearthed.

Avicenna, the "Prince of Physicians" some three hundred years, centuries later observed the same species of epidemic colic and wrote that "the paralysis is the crisis of the colic; and to many the sensation remains, and those who recover, recover by paralysis, for nature expels this material and brings it to the exterior."

Neither of these writers, however, expresses the belief that the disease they described was the result of lead. Yet many physicians before Paul were familiar with the effects of lead. Indeed Nikander, who wrote his "Alexipharmaca" in the 2nd century B.C. describes both colic and paralysis as the result of the ingestion of lead. Nikander's verses on cerussa as translated by Euricius Cordus close with:

Interdum obrepens oritur cum frigore somnus,
Torpet iners motus, languentia membra fathiscunt.

Sometimes a stealthy stupor comes with a chill
The feeble limbs droop, motion becomes slow, then still.

Nikander's verses on litharge were translated by Jacques Grévin de Clermont into quaint sixteenth century

French, in the following spirited passage:

N'ignores ie te pri', la Litharge mortelle
Dont la charge se sied dans le ventre, & cruelle
Fait autour du nombril enfler & tournoyer
Un grand vent tout bruyant, tel que peut essayer
Un homme tourmenté par la douleur cachee
Que lui est apportant l'incurable trenchee:

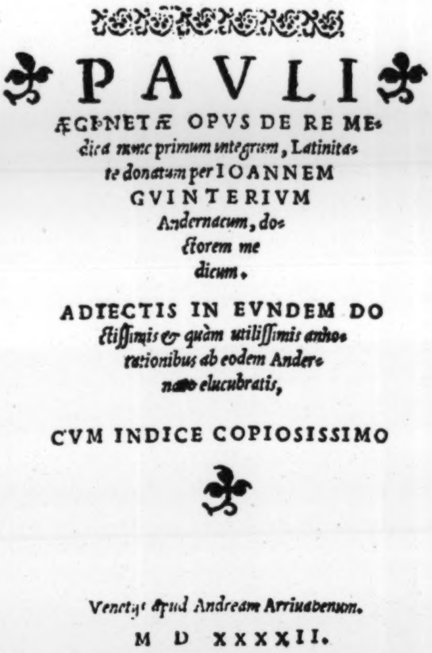
This verse is too picturesque to be marred by a translation. Sir John Harrington could probably have turned it into equally quaint Elizabethan English. But the reader with only a passing knowledge of French sees here a striking picture of the poor man who has taken litharge only to be tormented by an intense inward pain and the stirring up of a mass of gas which blows out his navel and causes an incurable colic.

These passages leave no doubt in our minds that Nikander who has been described as the most ancient medical writer after Hippocrates, knew that lead produced both colic and paralysis. He also was familiar with the ocular disturbances of lead poisoning:

Falso modo ante oculos rerum simulachra videtur.
False images of things only are seen before the eyes.

Indeed Nikander might well be called the poet laureate of lead colic. But this term would fail to do justice to his pharmacological or poetic talents, for he wrote verses not only about lead but about many other poisons. Nikander was praised by Cicero, imitated by Ovid, but Plutarch was unkind enough to say that his works had nothing poetical about them except the meter and that his style was bombastic and obscure.

Many other authorities were also familiar with certain features of lead poisoning. Dioscorides, who is usually considered the father of materia, medica, wrote that cerussa "causes hiccough, cough and dryness of the tongue, the extremities become languid, the mind gives way, the limbs are paralysed," and Galen very explicitly warned against drinking water that ran through lead pipes, which caused those who drank it to be subject to intestinal disorders. Vitruvius remarked that "water is much healthier from clay pipes than from lead pipes: since it seems to be poisoned by the lead, for white lead is formed from it: this moreover is said to be harmful to the human body."



PAVLI
ÆGINETÆ OPVS DE RE ME-
dica nunc primum integrum, Latinita-
te donatum per IOANNEM
GVINTERIVM
Andernacum, do-
ctorem me
dicum.

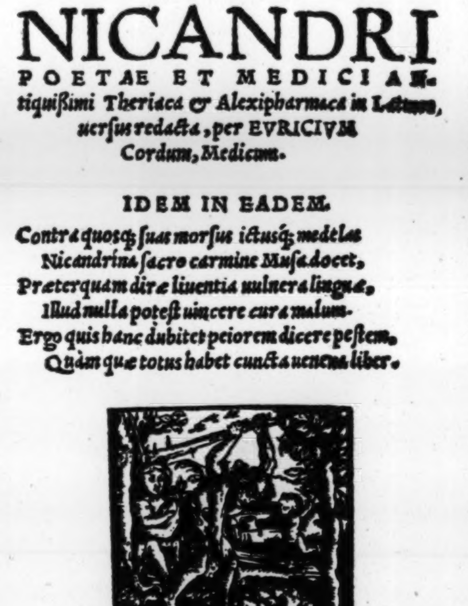
ADIECTIS IN EVNDEM DO
ctiſſimis & quàm utiliſſimis anno-
tationibus ab eodem Ander-
nacо elucubratis,

CVM INDICE COPIOSISSIMO

Venetijs apud Andream Arriuabenum.
M D XXXXII.

FIG. 1. TITLE-PAGE OF PAUL OF AEGINAS "DE RE MEDICA." 1542.

Paracelsus, in his works *Das Neudte Buch in der Artzney* ("de *Contracturis*"), *das ist von krummen und lahmen Gliedern* (the ninth book of therapeutics, "de Contracturis," that is concerning crooked and lame members) speaks of *Von Ursprung der Contractur die auss der Colica entspringt an Händen und Füssen ausgetheilt* (concerning the contracture that comes from the colic distributed to the hands and feet). Paracelsus, who as one of his critics remarks "in the midst of the most incomprehensible jargon, sometimes writes intelligibly" evidently in the course of his wanderings saw and studied lead colic. It has also been pointed out that Paracelsus who was very fond of prescribing lead as a remedy, may have himself caused many of the cases he saw. Indeed this may explain in part the circumstance that when he located in a town and began dispensing his remedies the people sometimes rose up against him and made things so unpleasant that he was forced to seek another location.



NICANDRI
POETAE ET MEDICI ANtiquißimi Theriaca & Alexipharmaca in Latinos,
uerſus redacta, per EVRICIVM
Cordum, Medicum.

IDEM IN EADEM.
Contra quosq; ſuas morſus ictusq; medelas
Nicandrina ſacro carmine Muſa docet,
Præterquam diræ liuentia uulnera linguæ,
Illud nulla poteſt uincere cura malum.
Ergo quis hanc dubitet peiorem dicere peſtem,
Quàm quæ totus habet cuncta uenena liber.

FRANCOFORDIAE Apud Chriſtianum Egenolphum.

FIG. 2. TITLE-PAGE OF NIKANDERS "THERIACA & ALEXIPHARMACA." 1532. TRANSLATED BY EURICIUS CORDUS.

Another physician in those distant times who has left us a good account of a case of lead poisoning was Jean Fernel of Amiens. We remember him as a patriotic Frenchman who, smarting with resentment because syphilis was so universally called the *morbus gallicus* or French disease, insisted that it be called the Disease of Venus or the venereal disease, as Jacques de Béthencourt had suggested. In his treatise "de luis venereae" he records the following history:

> A painter of Anjou, thirty years of age, of a good and sound constitution, noticed for the first time in 1557, that his fingers were heavier than usual, that they were numb and difficult to move; after several days he felt them contract and move convulsively, finally the affection was progressively aggravated, until the fingers remained flexed and could not be extended. Moreover, the affection reached the hands and arms, and so by the chilling of the nerves and tendons, filled with a thick humor, they became heavy, trembling and numb. Soon after he experienced the same trouble in his feet, and walking became impossible. However, he had very little pain in his feet, nor in his arms and hands. The poor fellow, as if he had not had already enough ills, saw a symptom appear much more serious and much more painful; for an acute and unbearable pain now attacked his stomach and hypochondrium and extended throughout his abdomen. This pain did not let up during the day or night, it was attempted but in vain to ease it with clysters, hot applications, baths and other remedies.

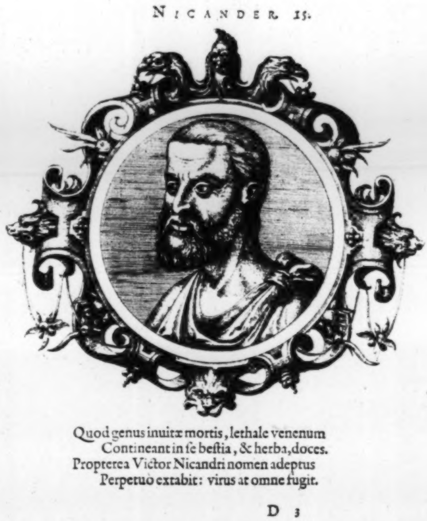
Fernel attributed the attack to cinnabar, a mercurial pigment which the painter constantly wiped off his brushes with his fingers. Later authors, however, have seen in this account the description of a typical case of painters' lead colic with paralysis and have pointed out that salivation, which would have occurred had the intoxication been due to mercury, was absent in Fernel's case. So that it was more than probable that the painter from Anjou became ill because he had the failing of wiping off lead paint from his brushes with his fingers. It is also a matter of interest that by a curious coincidence, Fernel describes on the same page of his "de luis venereae" the case of a friend of his who took, on the advice of an Empiric, powdered lead for his gout. This friend, after a terrible dysentery, became constipated and suffered from atrocious colics. This case he cites as a warning against the internal use of lead.

Felix Platter, who published the first classification of diseases in 1602, describes colic with paralysis. In his "Praxeos Medicae" he speaks of the colic with "atrocious pains & attacked by torments whence they call them *Tormina*, the *Germans* call them KRIM̃EN (gripes).

> Noises in the belly & creases, now in one place now running about in several places . . . Constipation attacks many . . . Terrible convulsions & weakness may moreover follow these pains now: which was unknown to most of the ancients, but is frequent in our generation. Now these complications may be general and affect the greater part of the body: now circumscribed they damage only certain parts. Thus impairment of motion has been frequently described.

Platter's description of lead colic is excellent but his explanation is less happy for he blamed it upon a retention of bile.

While there are many other scattered references by physicians to lead colic, it was François Citois who first established its right, as it were, to be considered a distinct disease, in his *diatriba de novo et populari apud Pictones dolore colico biliaco* which appeared in 1617. In this work, dedicated to his patron, Cardinal Richelieu, Citois described an epidemic of spasmodic colic occurring in the province of Poitou in 1572, and following this publication, we see the disease "colic of Poitou" or *colica pictonum* described with increasing frequency in the medical texts of the time.


NICANDER. 25.

Quod genus inuitæ mortis, lethale venenum
Contineant in ſe beſtia, & herba, doces.
Propterea Victor Nicandri nomen adeptus
Perpetuò extabit: virus at omne fugit.

D 3

FIG. 3. PORTRAIT OF NIKANDER. (COURTESY OF SURGEON GENERAL'S LIBRARY.)

Citois described in great detail the disease which he says appeared in the province of Poitou in 1572 and gradually became milder. He notes also that it had been previously observed in Paris and Picardy and moreover in Silesia, Moravia and throughout southern Germany. Citois begins his dissertation with the remark that his century had seen several other new diseases which were the instruments of

God's wrath upon a sinful and unrepentant world, particularly *lues venerea*, *sudor anglicus*, *plica polonica* and the scurvy. And now *colica pictonum* was added to the list.

FIG. 4. JEAN FERNEL—JOANNIS FERNELIUS AMBIANI.

Citois describes the characteristic colic which seized the patients and gives a particularly graphic account of the palsies. In describing the patients he writes:

> . . . they are seen moving about through the hamlets like ghosts or statues, pale, filthy, thin, with their hands crooked and hanging down from their own weight, they can be moved only with great effort to the mouth or upper parts of the body and not down to the feet but only to the muscles of the thighs. Their gait is ridiculous rather than provoking pity, the voice noisy and rattling.

Following the description of Citois in 1617, the "colic of Poitou" or "bilious colic," as already noted, takes its place in medical literature as a definite syndrome. Sydenham in his "Processus Integri" has a brief chapter, "De colica Pictonum" and writes, "This is a sort of colic, which is wont to degenerate into palsy, depriving the patient of the use both of his hands and feet [a fact noted by Riverius in his chapter on Palsy], and which is extremely common in the West Indies, where it destroys many persons." Thomas Willis wrote of colics with atrocious paroxysms and griping in the belly which were often followed by weakness and paralysis. Sydenham did not speculate as to the causation of the colic. Willis is more bold and explains it with the aid of his favorite theory, *à spiritum animalium defectu*.

Daniel Sennert, who saw and described many things clearly, even though he believed in witchcraft and pacts with the Devil, wrote:

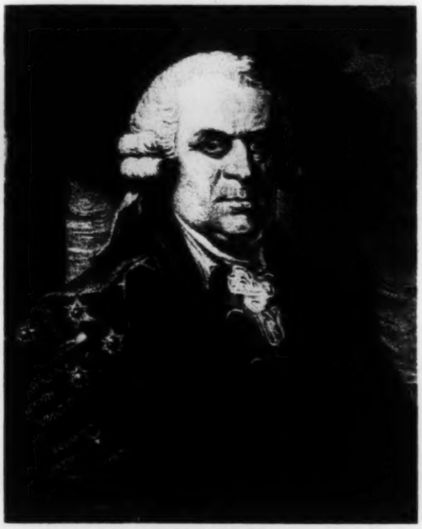
> . . . many widely different places, such as Moravia, Austria, Franconia & many other places have a colic for where strong, sulphuric & tartaric wines are in use it is common & frequently leads to paralysis, arthritis and epilepsy . . . Such a colic indeed was widespread in Silesia and in the Duchy of Tuscany in the year 1621.

Wepfer was very familiar with this colic which he ascribed to "wine either excessively sour or fumigated with sulphur and bismuth and mixed with other ingredients and adulterants."

Bernardino Ramazzini in his "De Morbis Artificium Diatriba," the first treatise on occupational diseases, published in 1700, noted that potters who work with lead often show its noxious effects. "For in them," he says, "at first tremors appear in the hands, soon they are paralyzed" and he adds "that rarely anybody sees a potter, in whom the countenance is not cadaverous and leaden."

Sydenham's remark that this colic "is extremely common in the West Indies" shows how widespread the malady was. William Hillary, who went to Barbadoes in 1752 and returned to London in 1758, described the disease in that very interesting book, "Observations on the Changes of the Air and the Concomitant Epidemical Diseases in the Island of Barbadoes," which first appeared in 1759. "This Colic," Hillary observes, "is most commonly called the Dry-gripes, and dry Belly-ache, and is a most painful Disease." He noted that those who "are immoderate Drinkers of spirituous Liquors, especially such as are fiery and new . . . are the most subject to this cruel Disease." He described the "griping Pains to the Bowels, which are soon after much distended with Wind" and the "Faeces, when they are discharged afterwards, are in little hard dry Lumps like Bullets." He mentions also the "unusual Sensation and Tingling along the spinal Marrow; which soon after extends itself from thence to the Nerves of the Arms and Legs, and they become weak, and that Weakness increases till those extreme Parts become paralytic, with a total Loss of Motion, though a benumbed Sensation often remains."

The dry belly-ache, Hillary saw occasionally while practicing in Bath but neither he nor his colleagues had any clear idea of its cause. For centuries it had tormented its victims. Sennert came very close to discovering the cause and Vicarius described colic and paralysis following the addition of litharge to wine. Indeed the Duke of Würtemberg in 1696 was so impressed with these facts that he issued a decree making it a capital crime to add litharge to wine. However, these scattered facts about the colic of Poitiers were either unheeded warnings or lacking conviction. The mystery was finally cleared up by the well-known investigations of Baker on Devonshire colic.



G. Baker.

FIG. 5. PORTRAIT OF SIR GEORGE BAKER. (COURTESY OF SURGEON GENERALS LIBRARY.)

Devonshire colic had probably been endemic for centuries. William Musgrave in 1703 wrote:

> . . . indeed there is another colic, in Devonshire, caused by the excessive use of cider crude and acid; it indeed comes from this, it infests only those, who are in the habit of drinking it, and moreover for this reason are affected: since during those seasons when the cider is abundant it spreads among the people; on the contrary when the apples are not abundant it is rarely seen. [He mentions a

> gentleman who had what they call the colica pictonum ending in paralysis] the joints then were weak, thin, without motion.

Dr. Huxham who is perhaps best known for his "Essay on Fevers" gave a very accurate account of the Devonshire colic as he saw it.

> In the beginning of the autumn 1724, a season particularly remarkable for an abundance of apples, it spread itself all over the county of Devon, among the populace especially, and those who were not very elegant and careful in their diet; and that, though it may not rage with the same degree of violence, and may affect a vastly less number of people, yet it infests that county more or less every autumn.

Huxham describes the colicky pains and paralysis in a vivid way. He also notes that apples were so abundant they were thrown to the hogs. "But the swine-hogs, as well as the swinemen, suffered from the gluttonous abuse of the apples; and all of them wasted greatly in their flesh, and many died." Huxham expressed his conviction that the Devonshire colic was due to the tartar, extracted from the apples in the process of making cider.

Huxham's explanation however failed to satisfy one doctor at least and a little over twenty-five years later Baker began his remarkable studies. George Baker was the son of the Vicar of Modbury, Devon, where he was born in 1722. He was educated at Eton and Kings College, Cambridge, taking his M.D. degree in 1756. He first began practice at Stamford in Lincolnshire but removed to London in 1761. He rapidly acquired a large practice, became physician to Her Majesty's household, and was created a baronet in 1776. He was nine times president of the College of Physicians. On June 29, 1767, he read his famous paper, "An Inquiry concerning the cause of the Endemial Colic of Devonshire," before the College of Physicians.

Baker is mentioned in "The Gold-Headed Cane" as a friend of its fourth owner, William Pitcairn, and described as "that profound and elegant scholar."

> To him the whole medical world looked up with respect, and in the treatment of any disease in the least degree unusual, if it was desired to know all that had ever been said or written on the subject, from the most remote antiquity, down to the case in question, a consultation was proposed with Sir George Baker. From *his* erudition everything was expected.

Baker's erudition and his familiarity with the medical literature of the past, probably suggested to him the similarity between *colica Pictonum*, Devonshire colic and Nikander's description of the effects of lead.

Baker was doubtless more or less familiar from his childhood with Devonshire colic. Although only two years old at the time of the great epidemic which Huxham described, yet he doubtless saw succeeding epidemics, and in later life, after becoming a physician, he developed an especial interest in this disease. Baker's keen mind saw an anology between lead colic and Devonshire colic and he studied Huxham's account closely. "For although" he said "I always pay that deference, which is due, to the authority of this celebrated physician, I have for some time conceived doubts concerning the solidity of his doctrine" (that Devonshire colic was due to the tartar of cider).

Baker first assembled some interesting data. He found that in the county of Kent a certain gentleman who thought his cider was too sour boiled it with honey in a brewing-vessel, capped with lead. All who drank of it were seized with Devonshire colic. He also learned that in the parish of Bury Pomeroy the cider as soon as made was stored in a large leaden cistern. Those "who drank the cider, thus prepared, were most cruelly tormented by the Devonshire colic: and that many died." He was also much impressed by the fact that while the cider of Devonshire produced colic, the cider of Herefordshire produced no such effects.

Baker finally proved his thesis conclusively by demonstrating that the cider of Devonshire contained lead while that of Herefordshire did not. He showed further that in Devonshire it was a common practice to line the cider-presses with lead.

Baker's investigations created a great storm. He was denounced as a "faithless son of Devon"; the lead he found in his experiments, came, it was asserted, from some shot which were used to cleanse the bottles and which had accidentally been left in them. The colic, it was loudly proclaimed by his opponents, was due to the humors of the body. This second objection he did not deem worthy of an answer, but the first one he demolished by pouring the cider through a cloth that would not allow shot to pass through and then demonstrating lead in the cider.

Still the storm raged. To one of his opponents, he wrote, "I here appeal to the conscience of one person, in particular, whose zeal has induced him to oppose my opinion in print, whether it be not true, that he has for many years sold sugar of lead to the farmers for the purpose of correcting sour cider." And Baker closes by saying that it seems most probable that lead is the cause of the disease. "In this opinion, however, I may have erred; but I shall be happy even in my error, if it shall excite some more successful inquirer to investigate, and to discover a truth of so much real importance to human society."

But the proof was complete. Lead was removed from the cider presses in Devon and Devonshire colic became a matter of history. Confirmations of Baker's views came from various parts of the world. It was found that in the West Indies, rum was distilled through pewter worms and the pewter contained a considerable quantity of lead. So the dry belly-ache that Hillary saw was caused by lead in the rum.

Two other very important observations in lead poisoning were made later. In 1834 Henry Burton examining patients in St. Thomas Hospital, London, noted an important diagnostic sign of lead poisoning.

> In a total number of fifty patients, [he wrote], who were examined whilst under the influence of lead, a peculiar discoloration was observed on their gums, which I could not discern on the gums of several hundred patients, who were not under the influence of lead . . . The edges of the gums attached to the necks of two or more teeth of either jaw, were distinctly bordered by a narrow leaden-blue line, about one twentieth of an inch in width, whilst the substance of the gum apparently retained its ordinary colour and condition.

Nothing further of importance was added to existing knowledge of lead poisoning for over sixty years. Then in 1900, Hamel, working in Grawitz' clinic, studied 25 cases of lead poisoning and found in all but 2, basophilic granules in the red blood cells, the same granules that Grawitz had described the previous year, in severe anemias. This observation was soon confirmed by numerous investigators and its great importance in the diagnosis of lead poisoning established.

Epidemics of lead colic, once so frequent, are now practically unknown. Their disappearance has been due to Baker's demonstration that "Devonshire colic" and *colica pictonum* were nothing other than lead poisoning. The world has long since forgotten that Baker was physician to Queen Charlotte or nine times president of the College of Physicians. His elegant and learned writings on epidemic catarrh and epidemic dysentery are known only to the medical antiquarian but his "Inquiry concerning the cause of the Endemial Colic of Devonshire" remains a medical classic, a model of clear accurate thinking, careful experimentation and lucid presentation.

Sporadic cases of lead poisoning still occur, but they are usually recognized easily by the demonstration of a lead line on the gums and of basophilic granulations in the red blood cells. Indeed, the presence of a lead line and basophilic granulations have saved many a patient with the tentative diagnosis of intestinal obstruction from an unnecessary surgical operation. The observations of Burton and of Hamel were thus also of tremendous importance and they may be rightly considered as ranking with the other landmarks in the history of lead poisoning.

The words written in italics: i.e. *colica pictonum*, appear in the original in italics; words written with small capitals below: as, KRIM̃EN and DAS NEUDTE BUCH IN DER ARTZNEY, are written in the original in Gothic type.

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1. PAULI AEGINETAE. Opus de Re Medica nunc primum intergrum Latinitate donatum per Ioannem Guinterium. Venetijs apud Andream Arrivaneum, MDXXXXII.
2. AVICENNA. Quoted by Baker.
3. NICANDRI. Poetae et Medici antiquissimi: Theriaca & Alexipharmaca in Latinos versus redacta, per Euricium Cordum, Medicum. Francofordiae Apud Christianum Egenolphum, Anno MDXXXII.
4. Les oeuvres de Nicandre traduictes en vers francais par Jacques Grévin de Clermont en Beauvaisis. Anvers. C. Plantin, 1567.
5. NICANDER. Alexipharmaca. Jo. Gorreaeo. interprete. Parisiis apud Vascosanum, 1549.
6. DIOSCORIDIS. Libri Octo graece et Latine. Parisii Apud Petrum Haultinum 1549.
7. Der Buecher und Schrifften des Edlen Hochgelehrten und Bewehrten Philosophi unnd Medici Philippi Theophrasti Bombast von Hohenheim Paracelsi genannt. Erster Theil. Franckfort am Meyn. Joh. Wechels Erben, Anno MDCIII.
8. IOANNIS FERNELII AMBIANI. Therapeutices Universalis. Francfurti Apud Andream Wechelum, MDLXXXI.
9. FELICIS PLATERI, quondam Archiatri et Profess. Basil. Ord: Praxeos Medicae. Basilae, Impensis Emanuelis König, MDCLVI.
10. CITOIS. Quoted by Baker.
11. THOMAE SYDENHAM, Medic doct. Opera Omnia Medica. Patavii, Typis Seminarii, MDCCXXV.
12. THOMAE WILLIS. Opera Omnia Caloniae MDCXCIV. De Anima Brutorum Pathologici, Caput XV, DePassione Colica.
13. DANIELIS SENNERTI, Vratislaviensis, D. & Medicinae in Acadamia. Wittebergensi Profess. P. Medicinae Practicae. P. 594. Venetiis MDCL. Apud Iuntas & Hertz.

14. WEPFER, JOH. JACOBI. Historiae apoplecticorum. Amstelaedami apud Janssonio-Waebergias, MDCCXXIV.

15. RAMAZZINI, BERNARDINI. Opera Omnia. Genevae, Cramer & Perachon, 1716.

16. HILLARY, W. Observations on the Changes of the Air and the Concomitant Epidemical Diseases in the Island of Barbadoes. London, 1766.

17. MUSGRAVE, G. De arthritide symptomica. Oxoniae, 1703.

18. HUXHAM. J. Opusculum de Morbo Colico Damnoniensi. Londini, J. Hinton, 1752.

19. BAKER, G. An inquiry concerning the Cause of the Endemial Colic of Devonshire. *Med. Trans.* London, 1: 175, 1772.

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21. HAMEL. Ueber die Beziehungen der körnigen Degenerationen der rothen Blutkörperchen zu den sonstigen morphologischen Veränderungen des Blutes mit besonderer Berücksichtigung der Bleiintoxication. *Deutsch. Arch. f. klin. Med.*, 67: 357, 1900.

A DESCRIPTIVE LIST OF THE INCUNABULA IN THE LIBRARY OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA*

THERE have been two lists of the Incunabula in the Library of the College of Physicians of Philadelphia published in the Annals of Medical History through the courtesy of the editor, Dr. Francis R. Packard, in 1919 and 1923 respectively. This, the third, is a republication of the entire list, with all accessions up to the present time, and contains a total of four hundred and one.

The arrangement is by authors, with more or less description to assist in the identification of the edition or publication. The ruling of "Hain" is followed and only books issued in the fifteenth century are classed under the head of "Incunabula." Further the form arrangement of author's names given by "Hain" is followed, with cross references when deemed necessary for clearness. Editions are arranged chronologically and not strictly alphabetically. Each work, or edition of a work is numbered *seriatim*.

The appended notes in the previous lists have been allowed to stand; while possibly of no great bibliographical importance they are of more or less interest as the comments of previous owners, and in some cases of real worth. In addition, when possible, the living dates have been placed after the name of each author.

There have been made in this Library, up to the present time, two hundred and seventy-three complete photostat copies of works mentioned in this list; these photostat copies are bound and available for use. Reproductions can be made for libraries at cost. An asterisk marks in this list the works of which photostat copies have been made.

Credit must be given to Miss Bishop and Miss Lippincott, of our catalogue department, for their care and attention in the preparation of this list.

LIST OF INCUNABULA

1. Abano s. Apono, Petrus de. [1250–1315 a.d.] [Conciliator differentiarum philosophorum et praecipue medicorum. Eiusdem tractatus de venenis.] [F. 1 vacat.] [F. 2a:] Conciliato[r] differentiaru[m] philosopho[r]um [et] p[r]eci | pue medico[rum] clarissimi viri Petri de Abano Pa- | tauini feliciter incipit. *** [F. 280b:] Exegimus deo fauto[r]e opus Co[n]ciliato[r]is magi- | stri Petri de abano medico[rum] physico[rum]q[ue] sua tem- | pestate p[r]incipis: Imp[r]essum papie per Gab[r]iele[m] | de grassis anno d[omi]ni. 1490. die sexta. nouemb[r]is. | *** [F. 293b:] LAUS DEO.

[293] ff F°. Papiae, Gabriel de Grassis, 1490.
[Hain no. 3.]

2. Abano s. Apono, Petrus de. [1250–1315 a.d.] [Conciliator differentiarum philosophorum et praecipue medicorum.] [F. 1 vacat.] [F. 2a:] Conciliato[r] differentiaru[m] philosopho[r]u[m] [et] p[r]eci | pue medico[rum] clarissimi viri Petri de Abano Pata | uini feliciter incipit. [F. 280b:] §Exegimus deo fauto[r]e op[us] Co[n]ciliato[r]is magistri | Pet[r]i de Aba[n]o medico[rum] physico[rum]q[ue] sua tempesta | te p[ri]ncipis: impe[n]sa v[er]o caractereq[ue] iucundissimo ma | gistri Ioha[n]nis herbo[r]t de Selge[n]stat alemani cuius | ars [et] ingeniu[m] ceteros facile supe[re]minet o[mn]es: Impres | sum Uenetijs a[n]no v[m]. i483. nonis feb[r]uis. |***

[284] ff F°. Venetiis, Johannes dictus Magnus Herbort de Siligenstat, Alemannus, 1483.
[Hain no. 6.]

*3. Abano s. Apono, Petrus de. [1250–1315 a.d.] [Tractatus de remediis venenorum.] [F. 1a:] Tractat[us] Pe[tri] d[e] Abano de remediis ueneno[rum]. [F. 32b:] §Finiunt Pe[trus] de Abano remedia ueneno[rum].

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*Compiled by Charles Perry Fisher, Librarian

[32] ff 4°. [Romae, Johannes Philippus de Lignamine Messanensis, circa 1473.]
[Not in Hain.]

*4. Abano s. Apono, Petrus de. [1250–1315 A.D.] [Tractatus de venenis.] [F. 1b:] §Tractatus de Uenenis. A magistro Petro de Abbano edit[us] | [F. 18b. in fine:] § Finit tractatus vtilissimus de Uenenis. | Per Magistrum Petrum de Abbano co[m]posi | tus. Impressus Rome. Anno domini. M |. CCCC.LXXXIIII. die [ver]o penultima Aprilis. | §Registrum folio[rum].

[18] ff 4°. Romae, Stephanus Plannck de Patavia, 1484.
[Hain no. 11.]

*5. Abano s. Apono, Petrus de. [1250–1315 A.D.] [Tractatus de venenis.] [F. 1a:] Incipit p[ro]logus in libellum de vene | nis: Excellentiss[i]mi medici m[a]g[ist]ri Pe | tri de Abbano. Anno d[omi]ni. i. 4. 8. 7. | [F. 34a:] Et sic imponit[ur] finis tractatui de vennenis [sic] | peritissimi medici magistri Petri de abba | no *** Imp[re]ssus p[er]. p. matheu[m] cerdois [de] vni | dischgrecz. Anno d[omi]ni. i. 4. 8. 7. die i8 dece[m]bris. |

[36] ff 4°. [Patavii], Matthaeus Cerdonis de Windischgraez, 1487.
[Hain no. 12.]

*6. Abano s. Apono, Petrus de. [1250–1315 A.D.] [Tractatus de venenis.] [F. 1a. vacat.] [F. 1b:] §Tractatus de Uenenis: a magistro Petro de Albano [sic] edit[us]. | [F. 18b:] §Finit Tractat[us] vtilissimus de venenis per magi | stru[m] Petru[m] de Abbano [com]positus. Imp[r]essus Rome | Anno d[omi]ni. M.CCCC.LXXXX. die v[er]o. xvii. Marcij. |

[18] ff 4°. Romae, Stephanus Plannck de Patavia, 1490.
[Hain no. 13.]

*7. Abano s. Apono, Petrus de. [1250–1315 A.D.] [Expositio problematum Aristotelis.] [F. 1–3:] Tabula. *** [F. 4. cum sign. a2.] Expositio p[r]eclarissimi atq[ue] eximii artium ac medi | cine docto[r]is Petri de Ebano Patauini in lib[rum] | p[r]oblematum Aristotelis feliciter incipit. | [F. 312 a. cum sign. Q6, in fine:] Explicit *** ea nullo p[r]i | us interp[r]etante incepta quidem Parisius [sic]: et laudabiliter Padue terminata. arte hac impen | sa Joannis herbo[r]t Alemani *** verum ut laute sint etiam elabo[r]ata. | Anno. M.CCCC.LXXXII. die. xxva. Feb[r]uarii. | [F. 312b. Register.]

[312] ff F°. Venetiis, Johannes dictus Magnus Herbort de Siligenstat, Alemannus, 1482.
[Hain-Copinger no. 17.]

Abdilazius
See—Alchabitius

*8. Aben Ezra (R. Abraham). [circa 1092–1167 A.D.] [Liber de nativitatibus.] [F. 1a vacat. F. 1b. icon xyl. F. 2a:] § Incipit liber Abraham iudei de natiuitatibus. | [F. 20b:] Explicit feliciter liber abraham iudei: Utilissimus in ea parte astro- | logie q[ue] de natiuitatib[us] tractat: cu[m] figuris exemplaribus singulis domi- | bus antepositis. | [Seq. f. 21a:] Magistralis compositio astrolabij hanrici bate. *** [F. 30a:] § Finit felicit[ur] opusculu[m] abrahe iudei de natiuitatibus cum exe[m]plarib[us] | figuris singulis domibus antepositis: Et Magistralis co[m]positio astro- | labij Hanrici bate. Impressu[m] venetijs arte [et] impensis Erhardi ratdolt | de augusta. Anno salutifere incarnatio[n]is d[omi] nice. M.CCCC.LXXXV. nona | kalendas Januarij. |

[30 ff] 4°. Venetiis, Erhardus Ratdolt de Augusta, 1485.
[Hain no. 21.]

*9. Abiosus, Joannes. [circa 1450–1500 A.D.] [Dialogus in astrologiae defensionem.] [F. 1a:] AD INVICTISSIMVM AC POTENTISSIMVM | BELLO ET PRUDENTISSIMUM SICILIE RE | GEM ALFONSUM. | Dialogus in astrologie defensionem Cnm [sic] Uaticinio a diluuio vsq[ue] ad Chri | sti annos. 1702. Joannis Abiosi Neapolis Regni Ex balneolo mathematica | rum professoris Artium [et] Meditine [sic] Doctoris. | [Tab. xyl. In fine:] Finit opus Dialogi [etc.] Et impressu[m] Uenetijs Die. 20 octobris | 1494. Per Magistrum Franciscum Lapicidam in contrata Sancte Lucie. Ad glo | riam Omnipotentis Dei qui assidue benedicatur. |

[37] ff 4.° Venetiis Franciscus Lapicida, 1494.
[Hain no. 24.]

Aegidius Corboliensis, Petrus
See—Aegidius Monachus

*10. Aegidius Monachus. [1165–1213 A.D.] [Carmina de urinarum judiciis cum expositione Gentilis de Fulgineo.] [F. 1a:] Carmina de urina[rum] iudiciis edita ab | excelle[n]tissimo [domi]no m[a]g[ist]ro Egidio cu[m] | co[m]mento eiusdem feliciter incipiunt. | [F. 60b:] Hic modus imponit[ur] Tractulo [d]e cogno | scendis urinis peritissimi magistri Egidii cu[m] | exposit[i]o[n]e [et] [com]me[n]to m[a]g[ist]ri Ge[n]tilis [de] fulgineo | su[m]ma cu[m] dilige[ntia] plurib[us] i[n] locis castigat[us] a m°. | Auena[n]tio [de] cameri[n]o artiu[m] [et] medici[n]e p[ro]fes- | so[r]e padueq[ue] i[m]p[r]essus [per] m[a]g[ist]r[u]m matheu[m] Cer

| donis [de] uuindischgrec[z] die 12 iulii. Anno 1483.

[64] ff 4°. Patavii, Mattheus Cerdonis de Windischgraez, 1483.
[Hain no. 100.]

*11. Aegidius Monachus. [1165–1213 a.d.] [Carmina de urinarum judiciis cum expositione Gentilis de Fulgineo.] [ff. 1–59 desider.] [F. 76b:] Hic finis imponitur tractatulo de cognoscendis v[r]inis [et] pulsu peri- | tissimi magistri Egidii cum expositione [et] commento magistri Gentilis de | fulgineo summa cu[m] diligentia pluribus in locis castigatus a mag[ist]ro Auena[n] | tio de camerino artiu[m] [et] medici[n]e p[ro]fesso[r]e Uenetiis i[m]p[r]essus [per] Benardinu[m] | Uenetu[m] expensis d[e] Ieronymi duranti die 16 mensis feb[r]uarii 1494. |

[76] ff 4°. Venetiis, Hieronymus de Durantis per Bernardinum Venetum de Vitalibus, 1494.
[Hain no. 101.]
Imperfect. ff 1–59 missing.

*12. Aegidius Monachus. [1165–1213 a.d.] [Carmina de urinarum judiciis cum expositione Gentilis de Fulgineo.] [F. 1a. tit:] [o]Pus excelle[n]= | tissimi magistri Egidij de v[r]inis et pulsu | cum expositione clarissimi magistri Gen | tilis de fulgineo. | [F. 1b. vacat:] [F. 2a:] Carmina de v[r]inarum iudicijs edita ab | excelle[n]tissimo domino magistro Egidio cu[m] | commento eiusdem feliciter incipiunt. | [F. 59a:] § Incipit liber magistri Egidij de | pulsibus metrice compositus. | [F. 80b:] De significationibus magni | pulsus s[e]c[undu]m naturam. |

[94] ff 4°. [Lugduni, Martinus Havard, 1499.]
[Reichling no. 1431.]
Imperfect. f 65 and ff 81–94 *missing.*

*13. Aegidius Monachus. [1165–1213 a.d.] [Liber metricus de pulsibus cum commentario Gentilis Fulginatis.] [F. 1a:] Uenantius mutius de camerino. Alexandro de bartholaciis | de monte ulmi.salutem plurima[m] dicit. *** [F. 48a:] §Hic finis imponit[ur] tractatulo pulsuu[m] Magistri | Egidii cu[m] co[m]m ento Gentilis de Fulgineo qui im | p[r]essus fuit Padue per magist[rum] Mattheu[m] cer- | donis de Uuindischgretz die Januarii Anno | domini 1484. |

[48] ff 4°. [Patavii], Matthaeus Cerdonis de Windischgraez, 1484.
[Hain no. 103.]

*14. Aegidius Columna s. de Roma, Ord. Eremit. S. August. [circa 1247–1316 a.d.] [De regimine principum.] [F. 1a:] () Eorgio miseratione diuina Archiepiscopo Ulixponen. Sacro- | sancte. Ro. eccesie. tituli sanctoru[m] Petri [et] Marcellini presbyte | ro Cardinali Reuerendissimo ac benemerito: Oliuerius Serui | us Tholentinus. S. P. D. [F. 1b tab. capp., quae term. f.4b.] [F. 5a:] Incipit liber de regimine p[r]incipu[m] | [etc.] [In fine:] Explicit liber [etc.] Impressum Rome per inclitu[m] viru[m] magistru[m] | Stephanum plannck. de Patauia Anno domi | ni Millesimo CCCCLXXXIJ. Die nona Mensis | Maij [et]c. [Register.]

[135] ff F°. Romae, Stephanus Plannck de Patavia, 1482.
[Hain no. 108.]

15. Aegidius Columna s. de Roma, Ord. Eremit. S. August. [circa 1247–1316 a.d.] Commentarii in octo libros Physicorum Aristotelis. [F. 1a. tit.:] Egidij Romani Com[m]e[n]taria in. viij li- | bros physico[rum] Aristotelis. | [F. 1b auct. nuncupat. clar. theol. Magistro Gratiano Fulginati ordinis sancti Augustini inscr. et ejusd. versus ad lect. F. 2a–3b Prologus. F. 4a:] §Fidelissimi Aristo. interpretis Egidij Romani | almi ordinis Heremitar[um] super octo libros phisici | auditus co[m]mentaria. | [F. 237b col. 2:] Preclarissimi su[m]miq[ue] ph[ilosoph]i. F. Egi. Ro. ordinis Ere- | mitar[um] diui augustini i[n] octo ph[ys]icor[um] libros i[n]terp[re]tat[i]o | fidelissima explicit. Imp[re]ssa i[n] almo gimnasio pataui | no i[m]pensis. ac dilige[n]tia solertissimi viri Hyeronimi | durantis i[m]pressoris accuratissimi a[n]no salutis. | M. | CCCC.LXXXXIIJ. die xv. me[n]s[is] octobris ad laude[m] eterni | dei eiusq[ue] glorisissime matris virginis marie. | [Acced. Privilegium Reip. Venetae. F. 238a–241b Egidii Viterb. versus ad lect. et tab. F. 242a register.]

[242] ff F°. Venetiis, Hieronymus de Durantis, 1493.
[Hain no. 128.]

*16. Aegidius Columna s. de Roma, Ord. Eremit. S. August. [circa 1247–1316 a.d.] [Commentum super libros duos posteriorum analyticorum Aristotelis.] [F. 1a tit.:] Expositio Egidii Romani | super libros Posteriorum | Aristotelis cu[m] textu eiusde[m]. | [F. 2a (c. sign. 1. ij et n. 2):] § Excelle[n]tissimi artium et sacre theologie doctoris d[omi]ni | Egidij Romani archi[e]p[i]s[cop]ulis Biturice[n]sis: ordi[ni]s Ere- | mitar[um] s[an]c[t]i Augustini in libros posterio[rum] Ar[istotelis] exp[ositi]o. | [F. 128a. col. 2.:] § Uenetijs per Simonem de Luere. sum | ptibus d[omi]ni Andree Torresani de Asula. | .18. Maij. 1500. |

[128] ff F°. Venetiis, Andreas Toresanus de Asula per Simonem de Luere, 1500.
[Hain no. 139.]

17. AENEAS SYLVIUS POSTEA PIUS II PONT. MAX. [1405–1464 A.D.] Epistoles familiares. [Praeced. 5 ff.:] Numerus et ordo epistolaru[m] in hoc ope [re cententarum.*** Eneas siluius nomen | erat: familiares epistole ad diuer | sos in quadruplici vite eius statu tra[n]smisse: Im | pensis anthonij koberger nuremberge impresse. finiu[n] t. xvj kalendas augusti Anno salutis christiane [etc.]. M.CCCCLXXXVJ. [4. g. ch. c. f. 521.]

[244] ff. 4°. Norimbergae, Antonius Koburger a. Koberger, Norimbergensis, 1486.
[Hain no. 154.]

*18. ALBERTUS CARRARIENSIS, JOH. MICH. [circa 1450–1500 A.D.] De omnibus ingeniis augendae memoriae libellus. [F. 1a:] Johannis Michaelis Alberti carrariensis de omnibus | Ingeniis auge[n]de memorie: ad presta[n]tissimu[m] | Virum Alouisium Manentem Inclyti Venetorum Senatus Se- | cretarium libellus foeliciter incipit. | [F. 12b:] FINIS. | Libellus de omnibus ingeniis auge[n]de memorie foeliciter explicit. | Impressum Bononiae per me Platonem de benedictis | ciue[m] Bono | niensem Regnante Inclyto Principe. d. d. Johanne Bentiuolo se- | cu[n]do a[n]no incarnato[n]is dominice MCCCCLXXXXI. die xxiiii. Ianuarii | [4 minim. r. ch. c. f. 36–38 l. |

12 ff. 4°. Bononiae, Plato de Benedictus, Bononiensis, 1491.
[Hain no. 426.]

*19. ALBERTUS MAGNUS. [1193–1280 A.D.] [De anima libb. III.] [F. 1a. vacat. F. 2a (sign. a^2):] Clarissimi ph[ilosoph]i Alberti magni: almi p[re] = | dicator[um] ordinis episcopi Ratispon[is] liber | de anima p[ri]mius incipit; cui[us] tractat[us] prim[us] est | de modo quo cognosce[n]da est a[n]i[m]a. [F. 124a col. 2. l. 16:] Alberti mag[n]i expliciu[n]t fnie (sic) libri de a[n]i[m]a | [et] de int[e]ll[e]ctu [et] int[e]lligibili: Uenetijs p[er] m[a]g[ist]r[e]m | raynaldu[m] de Nouimagio imp[r]esse. 1481. | [Registr.]

[124] ff F°. Venetiis, Raynaldus de Novimagio, 1481.
[Hain no. 496.]

*20. ALBERTUS MAGNUS. [1193–1280 A.D.] [Summa naturalium sive Opus philosophiae naturalis.] [F. 1a:] Phia. d. Alberti. M. | [F. 2a:] Illustrissimi philosophi & theologi: domini Alberti magni co[m]pen | diosum: i[n]signe: ac perutile opus Philosophie naturalis: feliciter i[n]cipit. | De acceptione ho[rum] nominu[m]: nautra & naturale. Cap. I. | *** [F. 52a:] Impressum Uenetiis per Georgium de Arriuabenis: Anno Domini. | M.CCCCLXXXXVI. die ultimo mensis Augusti. | *** [F. 53b.] Finis. | ***

[54] ff il. 2 wood-cuts. 4°. Venetiis, Georgius de Rivabenis, Arrivabenus Mantuanus, 1496.
[Hain no. 506.]

*21. ALBERTUS MAGNUS. [1193–1280 A.D.] [De coelo et mundo.] [F. 1 vacat. F. 2a (c. sign. a i i et n. 2.):] Incipit liber primus de celo [et] mu[n]do Al | berti magni philosophi clarissimi. | [F. 65a. col. 1:] FINIS. | § Expliciu[n]t hic dicta subtilissima Diui Alberti co | gnomento magni. Ratisponensis ep[iscop]i [et] ordine predi | catorum assumpti: emendata per me fratrem Iero | nymum mitanum monoplitanum ordinis eiusdem | Impressum Uenetiis per Ioannem de forliuio: [et] Gregorium fratres. Anno domini. M.CCCCLXXXX. | die XVIII. Nove[m]bris. | Registrum *** [Insig. typogr.]

[66] ff il. F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1490.
[Hain no. 511.]

*22. ALBERTUS MAGNUS. [1193–1280 A.D.] [Libri IV meteororum.] [F. 1. vacat. F. 2a (c. sign. a^2):] Liber methauroru[m] alberti magni ordi | nis predicator[um] germanoru[m] decoris nostro | euo philosophie facile principis felicissime | incipit. | [F. 96a. in fine:] Expliciunt libri quatuor Methauroru[m] | Alberti magni excellentissimi sacre Theo- | logie doctoris nec non ph[ilosoph]ie principis ordi- | nis predicatorum impressi p[er] Renaldum de | Nouimagio theotonicum. Anno d[omi]ni. M. | CCCC.LXXXVIIJ. Mensis Maij die. xxiiij. |

[96] ff il. F°. [Venetiis, Raynaldus de Novimagio, 1488.]
[Hain no. 513.]

*23. ALBERTUS MAGNUS. [1193–1280 A.D.] [De generatione et corruptione.] [F. 1a:] Liber Alberti De generatione [et] co[r]ruptione. | Incipit Liber de generatione [et] co[r]ruptione. Cu | ius tractatus p[r]imus est de generatione [et] co[r]ruptio | ne in co[m]muni simpliciter dictis. | [F. 23a:] Imp[r]essum Uenetijs per Ioan[n]em [et] G[r]ego[r]iu[m] de | G[r]ego[r]ijs fratres. Anno. d[omi]ni. M.CCCC.LXXXXV. die | decima Iunij. | ***

[24] ff F°. Venetiis, Johannes et Gregorius de Gregoriis, de Forlivio, 1495.
[Hain no. 517.]

*24. ALBERTUS MAGNUS. [1193–1280 A.D.] [Physicorum s. de physico auditu libri octo. Alberti magni Commentaria in octo libros Physicorum Aristotelis.] [F. 1b.] §Excellentissimo medico preclarissimoque philosopho

d[omi]no Jacobo battifero patri observando. Matheus | battifero vrbinas artium doctor et medicine S. [In fine.] §Explicit co[m]mentum Doctoris excellentissimi | Alberti magni ordinis predicatorum in libros phys | icoru[m]. Impressu[m] Venetiis per Joa[n]nem de forlivio | et Gregoriu[m] fratres. Anno d[omi]ni M.CCCC.LXXXVIII. die VIII. Januarii. | [Register.]

[168] ff F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1488.
[Hain-Copinger no. 518.]

*25. ALBERTUS MAGNUS. [1193–1280 A.D.] [Mineralium libri v.] [F. 1a:] Alberti Magni philosophor[um] maximi de mine- | ralibus liber primus incipit.] [F. 21b:] Impressum Uenetijs per Joannem [et] Gregoriu[m] | de Gregorijs fratres. Anno d[omi]ni M.CCCC.LXXXXV. | die. xxij. Junij. | [Registr.]

[22] ff F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1495.
[Hain no. 522.]

*26. ALBERTUS MAGNUS. [1193–1280 A.D.] [Liber aggregationis seu secretorum de virtutibus herbarum, etc.] [F. 1a.tit:] Liber secreto[r]rum Alberti magni de virtutibus herba | rum.et animalium quo[r]undam. Eiusdemq[ue] liber. de | mirabilibus mundi.et etiam de quibusda[m] effectibus | causatis a quibusdam animalibus. [etc.] | [F.2a:] Liber aggregationis seu liber secreto[rum] Alberti mag | ni de v[ir]tutibus herbaru[m].lapidu[m].et a[n]i[m]aliu[m] quoru[n]dam Liber primus de v[ir]tutibus [q[uo]rundam herbarum. | *** [F. 16b.l.26:] §Eiusde[m] Alberti magni mirabilibus mundi | feliciter incipit. | *** [F.34a:] Imp[r]essum Auguste [per] Johanne[m] schauren fe[r]ia secunda post Bartholomei M.CCCC.LXXXXVJ. |

[34] ff 4°. Augustae Vindelicorum, Johannes Schaurer, 1496.
[Hain no. 542.]

27. ALBERTUS MAGNUS. [1193–1280 A.D.] [Opus de animalibus.] [F. 1a:] Incipit liber Alberti magni animalium | p[r]imus [qui] est de co[m]muni diuersitate a[n]i[m]alium | *** [Ad finem:] Finit feliciter opus Alberti magni philoso | phi de animalibus: [et] imp[r]essum Mantue per | Paulum Johan[n]is de Butschbach alamanum Maguntinen[sis] dioce[sis] Sub anno d[omi]ni Mille | simo quadringentesimo septuagesimonono: die | uero duodecima Januarij ***

[306] ff F.° Mantuae, Paulus Johannes de Putzbach Moguntinensis Dioeces., 1479.
[Hain no. 546.]
Imperfect. 2 ff of table and 1 f blank missing.

28. ALBERTUS MAGNUS. [1193–1280 A.D.] [Opus de animalibus.] [F. 1a. tit.:] Diui Alberti Magni de Animalibus | libri viginti sex Nouissime Impressi. | [Deinde typogr. ad lect. F. 2a tab., quae f. 6b term. F. 7a (c. sign. a et n. ·1.) incipit opus. F. 260a (c. n. 254.):] Impressum Uenetijs per Iohannem [et] Gregoriu[m] | de Gregorijs fratres. Anno incarnationis dominice | Millesimo quadringentesimo nonagesimo quinto die. xxi. Maij. Regnante d[omi]no Augustino Barbadi | co inclito Duce Uenetia[rum]. | [Registr. et insign. typogr.]

[6], [254] ff F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1495.
[Hain no. 547.]

*29. ALBERTUS MAGNUS. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a:] [S]Cribit philosophus ph[ilosoph]o[r]um | p[r]inceps su[m]mus. *** [F. 83b. l. 16:] seculo[r]um Amen. |

[84] ff 4°. [Ulmae, Johannes Zeiner de Reutlingen, 1473.]
[Copinger no. 197.]

*30. ALBERTUS MAGNUS. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a.tit:] Albertus magnus | de secretis mulie | rum et viro[r]u[m]. | [F. 33b. l. 17:] omnium per infinita secula seculo[r]um. Amen. |

[33] ff 4°. [Augustae Vindelicorum, Johann. Froschauer. Augustens., 1475.]
[Hain no. 555.]

*31. ALBERTUS MAGNUS. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a:] [P]Hilosoph[us] ph[ilosoph]o[r]um | p[r]inceps q[ua]rto ethi | co[rum] scribit. *** [F. 44a:] Finis huius tractatuli vene– | rabilis Alberti magni. |

[44] ff 4°. [Argentorati, Henricus Knoblochtzer, 1480.]
[Hain no. 558.]

*32. ALBERTUS MAGNUS. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a:] [S]Cribit philosophus philoso | pho[r]um p[r]inceps.quarto ethi | co[r]um homo est optimum. *** [F. 48a:] Alberti magni de secretis mulie | rum tractatus feliciter explicit. |

[48] ff 4°. [Antverpiae, Matthys van der Goes, 1486.]
[Copinger no. 191.]

*33. Albertus Magnus. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a. tit:] De fo[r]matio[n]e ho[min]is | in vtero materno |. *** [F. 53b:] Liber de fo[r] | matione ho= | [F. 54a:] minis in vte | ro materno | co[n]gruentissime inscriptus finit fe | liciter ad laude[m] eius qui hu[n]c mo- | du[m] p[ro]pagandi genus humanu[m] eide[m] benedicendo instituit dicens Cre | scite et multiplicamini. |

[54] ff 4°. n. p., n. pub., [circa 1490.]
[Not in Hain.]

*34. Albertus Magnus. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a. tit:] Albertus magnus de secretis | mulierum cum commento. | [F. 2a:] §Expositio super henricu[m] de sa- | xonia de secretis mulierum. In- | cipit fœliciter. | [F. 56b:] FINIS | §Impressum Romæ. 1499. | die. 8. Iulii. | ***

[56] ff 4°. Romae [Eucharius Silber, Archirion, al. France,] 1499.
[Reichling no. 372.]

*35. Albertus Magnus. [1193–1280 A.D.] [De secretis mulierum et virorum.] [F. 1a. tit:] Albert[us] Magnus de secretis mulieru[m] | et viro[r]um. | [F. 2a:] [S]Cribit ph[ilosoph]us philo[s]opho[r]u[m] p[r]inceps. | *** [F. 41b:] Imp[r]essum liptzk per Melchio[r]em | Lotter Anno Millesimoqui[n]ge[n]tesimo. |

[41] ff 4°. Lipsiae, Melchior Lotter, 1500.
[Hain no. 568.]

*36. Albertus Magnus. [1193–1280 A.D.] [Summa de quatuor coaevis et de homine.] [F. 1a. tit:] P[r]ima Pars Summe | Alberti Magni | De Quatuo[r] Coequeuis | vna cum secunda | eius que est De homine. | [F. 79b. (c. n. 77):] §Explicit Liber p[r]ime Partis Su[m]me D[omi]ni | Alberti Magni de Quatuo[r] coequeuis. | Uenetijs Imp[r]essum per Simonem de Luere | Impensis domini Andree To[r]resani de Asula: arte v[er]o Simo | nis de luere. xvi° feb[r]uarij. 1498. | Feliciter. |

[197] ff F°. Venetiis, Andreas Toresanus de Asula per Simonem de Luere, 1498.
[Hain no. 569.]

*37. Albertus Magnus. [1193–1280 A.D.] Opus de mirabilibus mundi. [F. 1a:] INCIPIT. OPUS. ALBERT. MAGNI. DEMIRABILIBUS. MVNDI. LEGE. FOELI | CITER. | [F. 24a.] in fine: | ALBERTI. MAGNI. DE SECRETIS | NATVRAE. LIBER. EXPLICIT. | FOELICITER. | [F. 25a:] TABULA. ALBERTI MAGNI. | [F. 28a:] FINIS. |

[28] ff. 4°. [Venetiis, Johannes de Rheno, circa 1475–1482.]
[Not in Hain.]
[Gesamtkatalog der Wiegendrucke no. 693.]

*38. Albertus de Saxonia. [circa 1353–1390 A.D.] Quaestiones in Aristotelis libros de coelo et mundo. [F. 1a tit.:] Questiones subtilissime. | Alberti de saxonia in li | bros de celo [et] mundo. | [F. 51a. col. 2:] § Expliciu[n]t questiones p[r]eclarissimi doctoris alberti de | saxonia sup[er] q[ua]ttuo[r] libros [de] celo [et] mu[n]do Ari. dilige[n]tissime | eme[n]date p[er] eximiu[m]artiu[m] [et] medici[n]e docto[r]e[m] magist[rum] hiero- | nymu[m] Surianu[m] Venetu[m] filiu[m] d[omi]ni mag[ist]ri Jacobi Suriani physici p[re]sta[n]tissimi. Imp[re]sse a[u]t Venetijs Arte Boneti [de] lo- | catellis Bergome[n]sis. Impensa v[er]o nobilis viri Octauiani | scoti ciuis modoetie[n]sis. Anno salutis n[ost]re. 1492. nono kale[ndae]. | noue[m]bris Ducante inclito p[ri]ncipe Augustino barbadico. Registrum | [F. 51b. col. 2:] FINIS. | [Insign. typogr.] O SM.

[51] ff F°. Venetiis, Octavianus Scotus, Modoetiensis per Bonetum Locatellum, Presbyter. Bergomensis, 1492.
[Hain no. 576.]

*39. Albucasis. [–1009 A.D.] [Liber servitoris.] [F. 1a:] INCIPIT LIBER SERVITORIS LIBER | xxviii. Bulchasi[m] Benaberazerin tra[n]slatus a Si | mo[n]e ianue[n]sis i[n]terprete Abraa[m] iudeo tortuosie[n]si. [[D]ixit aggregator huius operis: | Postq[uam] ego collegi librum hunc | magnu[m] i[n] medici[ni]s co[m]positis: q[ui] e[x] liber magni iuuamenti: quem | nominaui librum seruitorem. | *** [F. 64b. In fine:] Finit Seruitoris prepa[ra]t[i]o[n]e medi[cin]ar[um] si[m]pliciu[m] | i[m]- | pressus Venetiis p[er] Nicolau[m] Ie[n]so[n] gallicu[m]. MCCCCLXXI. |

[64] ff 4°. Venetiis, Nicolaus Jenson, Gallicus, 1471.
[Copinger no. 3450.]

40. Albucasis. [–1009 A.D.] [Liber servitoris de preparationibus medicinarum.] [F. 68a:] Liber seruito[r]is de p[r]eparac[i]oni | bus medicina [rum] *** Incipit feliciter. |

[In- Mesue Damascenus, J. Antidotarium. *** circa 1480. ff 68a–92b.]
Imperfect. ff 93–95 missing.

Albucasis
See—Cauliaco, Guido de Chirurgia cum aliorum tractatibus. *** 1500.

*41 Alchabitius s. Abdilazi. [–950 A.D.] [Libellus isagogicus de planetarum conjunctionibus.] [F. 1a. vacat. F. 1b. Sphaera mundi. F. 2a:] LIBELLVS YSAGOGICVS ABDILAZI. IDEST SERVI GLO | RIOSI DEI: QVI DICITVR ALCHABITIVS AD MAGISTE | RVM [sic] IVDICIORVM ASTRO-

RVM INTERPRETATVS A IO | ANNE HISPALENSI SCRIPTVMQVE IN EVNDEM A IO | HANNE SAXONIE EDITVM VTILI SERIE CONNEXUM | INCIPIVNT. [Term. f. 26b. Deinde f. 27a. (c. sign. A.):] COMENTVM IOHANNIS DE SAXO | NIA SVPER TEXTV ALCHABICII. | [In fine:] Finitur scriptum super alchabitiu[m] ordinatu[m] p[er] Ioa[n]ne[m] de saxonia in | uilla parisiensi anno. 1331. Correctu[m] per artium & medicinae doctorem | domi[n]um Bartholomeum de alte[m] & nusia. Imp[re]ssum uenetiis p[er] Ioa[n]nem | & Gregoriu[m] de forliuio fr[atr]em a[n]no salutis. MCCCCLXXXXI. i[n] die. xxvi. Iulii. | Tabula foliorum huius operis. | [quae term. verbo:] FINIS. |

[82] ff il. 4°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1491.
[Hain no. 618.]

*42. ALEXANDER APHRODISAEUS S. APHRODISIENSIS. [circa 150–200 A.D.] Enarratio de anima ex Aristotelis institutione, lat. per Hieronymum Donatum. [F. 1 vacat. F. 2a:] HIERONYMI DONATI PATRICII VE- | NETI IN INTERPRETATIONEM ALE- | XANDRI APHRODISEI. | [F. 5a:] Alexandri aphrodisei enarratio de anima ex ari- | stotelis institutione. interprete Hieronymo dona |- to Patritio Veneto. | [F. 91a:] Laus Deo Finis. | [Eod. f. b:] Errata recognita: non passim o[mn]ia sed a[n]i[m]aduersione | digna. | [F. 92a:] Impressum Brixiae eodem Hieronymo Donato | Alexandri Interprete urbis praeside. Solerti Bernar | dini de misintis de Pap[iae] Impressoris opera. Anno | salutis et gratiae. M.CCCC.LXXXXV. idibus. Septemb. |

[92] ff 4°. Brixiae, Bernardinus Misintis de Papia, 1495.
[Hain no. 656.]

*43. ALEXANDER APHRODISAEUS S. APHRODISIENSIS. [circa 150–200 A.D.] Problemata lat. per Georgium Vallam. [F. 1a vacat. F. 1b:] VICTOR pisanus Ludovico mucenigo; praecellenti in eloquentia utro. S. P. D. | [In fine ep.:] In hoc uolomine contine [n] tur Alexandri aphrodisei [pro] blemata per Georgiu[m] ualla[m] in latinu[m] co[n]- | uersa. Aristotelis problemata [per] Theodoru[m] gaza[m]. Plutarchi problemata per Iohanne[m] petru[m] | lucensem impressa Venetiis per Antonium de strata Cremonensem. | [F. 88a:] expliciu[n]t problemata Alexandri aphrodisei: e graeco in latinu[m] traducta [per] Georgium Vallam. Et. | Aristotelis problemata Theodoro i[n]terp[re]te. Et Plutarchi problemata; simul seriati[im] [que] eme[n]da | tissima; exceptis istae (sic) Plutarchi tribus uel ad sum[m]um quatuor locis ubi graecu[m] exe[m]plar mancu[m] erat; tu cu[m] melius habueris tua diligentia iungito. Vale Impressu[m] Venetiis per Antoni | um de strata cremonensem. Anno salutis n[ost]rae. MCCCCLXXXVIII. die Sabbati iii. no. ianuarii. [Registr. f. r. ch. c. f. 55 l.]

88 ff. F°. Venetiis, Antonius de Strata, Cremonensis, 1488.
[Hain no. 658.]

*44. ALEXANDER BENEDICTUS PAEANTIUS. [–1525.] [De observatione in pestilentia.] [F. 1a. tit:] De obseruatione in pestilentia. | [Eod. f. b:] QVINTII. HAEMYLIANI. CIMCRIACI. | POETAE. HENDECASYLLABICON. | IN. V. LI. ALEXANDRI. | PAEANTII. AD | LECT. [F. 2 et 3. exhib. ep. auct. ad Jac. Contarenum Patr. Venet., etc. F. 4a tab. Eod. f. b. incip. opus, quod est quintus liber de febribus. In fine:] FINIS. Quinti libri de febribus | Impressum uenetiis per Ioannem & Gregorium de | gregoriis quarto Kale[n]das Augustas. | MCCCCLXXXXIII. | Iacobi Co[n]tareni Patricii Veneti: Phi- | losophi[s] Iurisq[ue] co[n]sultissimi: | Optimis Auspiciis. [Ult. f. b:] Errores sparsim collecti. |

[27] ff 4°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1493.
[Hain no. 807.]

*45. ANDREAE, ANTONIUS ORD. MINOR. [–1320.] Scriptum aureum super metaphysicam Aristotelis. [F. Ia vacat. F. 1b registr. F. 2a rubro:] Incipit scriptum aureum sup[er] metaphysica[m] Ari | stotelis s[ummu]m nouam translatione[m] editum ab excelle[n] | tissimo viro fratre Antonio Andree ordinis mino | rum p[ro] uincie Aragonie. Proemium. [F. 154a col. 2.:] Scriptum super metaphysica[m] Aristotelis secu[n]dum noua[m] translatione[m] editum ab excellentissimo | viro fratre Antonio Andree ordinis mino[rum] p[ro]uin | cie Aragonie his fine[m] habem feliciter. Uenetijs cura | et diligentia impressum p[er] Antoniu[m] de strata de Cre | monia. Anno d[omi]ni MCCCCLXXXij. Die vero. xxi. No- | ue[m]bris. Sixto. iiij. pontifice maximo Rome Petri | sedem regente: et Joa[n]ne Mocenico inclyto principe Uenteijs principante. | [f. g. ch. c. f. a-m et A-L 2 col.]

154 ff. F°. Venetiis, Antonius de Strata, Cremonensis, 1482.
[Hain no. 983.]
[Gesamtkatalog der Wiegendrucke no. 1674.

*46. ANDREAE, ANTONIUS ORD. MINOR. [-1320.] Quaestiones de tribus principiis rerum naturalium. [F. 1a:] Questio[n]es famosissimi do | ctoris Antonii Andree de | trib[us] pri[n]cipiis reru[m] n[atur]aliu[m]. [F. 61a:] Incipit tractatus de e[n]te [et] essentia s[an]c[t]i Tho[m]e de aq[ui]no. | [F. 66a. in fine:] Expliciu[n]t qu[aesti]o[n]es sup[er] trib[us] p[ri]ncipiis reru[m] | naturaliu[m] [et] formalitates Anto[n]ii a[n]dree | necno[n] [et] s[an]c[t]i Tho[m]e tractat[us] de e[n]te [et] e[ss]e[ntia] ab excelle[n]tissi[m]o sac[ra]e theo[logia]e p[ro]fess[or]e Tho[m]a | pinchet a[n]glico ex heremitaru[m] ordi[n]e | i[n]ge[n]ti dilige[nti]a eme[n]d[at]e [et] p[er] magi[stru]m Laure[ntia]m | de le[n]de[n]aria Padue i[m]p[re]sse. M°CCCC°LXXV.

[66] ff F°. Patavii, Laurentius Canozius Lendenariensis, 1475.
[Hain-Copinger no. 990.]

*47. ANGLICUS DE GATISDEN, JOHANNES. [circa 1280–1361 A.D.] [Rosa anglica practica medicinae.] [F. 1a. tit:] Rosa anglica p[r]actica me | dicine a capite ad pedes. | [F. 2a:] Nicolaus scyllatius siculus magnifico ac p[rae]stantissimo Amb[r]osio varisio rosato ducali phi-| sico ac [con]siliario sapie[n]tissimo. S. D. | [F. 177b:] Papie 1492. die 24. Ianuarij. | Ioa[n]nesantonius birreta i[m]p[r]essioni tradidit. |

[177] ff F°. Papiae, Joannes Antonius de Biretis, 1492.
[Hain no. 1108.]

*48. APICIUS COELIUS. [circa 250–300 A.D.] [De re culinaria.] [F. 1a. tit:] Apitii Celii de re Coquinaria libri decem. | Suetonius Tra[n]quillus De Claris Gra[m]maticis. | Suetonius Tra[n] | quillus De Claris Rhetoribus. | *** [F. 32b:] Impressum Venetiis per Bernaradinum Venetum. | [F. 33a:] C.SVETONII TRANQVILLI DE GRAMMATICIS: ET RHETORIBVS CLARIS LIBELLVS. | *** [F. 40b:] Suetonii Tra[n]q[ui]lli de claris Gra[m]maticis: & rhetorib[us]. Finis. |

[40] ff 4°. Venetiis, Bernardinus Venetus de Vitalibus, 1497.
[Hain no. 1282.]

*49. APOLLINARIS CREMONESIS. [circa 1420–1470 A.D.] Expositio in primum posteriorum Aristotelis. [F. 1a. tit:] Apolinaris expositio in primum | posteriorum Aristotelis cum que | stionibus eiusdem. | [F. 47b (c. sign. hh^5) in fine:] § Expliciunt questiones *** correcte atq[ue] emendate per eximium artiu[m] [et] medi- | cine doctorem Magistrum Hieroymum surianum fi- | lium domini Magistri Jacobi suriani Ariminensis physi | ci prestantissimi. Impresse vero Uenetijs arte Boneti de | locatellis bergomensis. impensa nobilis viri D[omi]ni Octaui- | ani scoti ciuis modoetiensis. Anno salutis nostre. 1493. | 14. kalendas apriles. Ducante inclito principe Augustino | Barbadico. |

[46] & [48] ff F°. Venetiis, Octavianus Scotus, Modoetiensis, per Bonetum Locatellum, Presbyter. Bergomensis, 1493.
[Hain no. 1284.]

APPONUS, PETRUS
See—ABANO S. APONO, PETRUS DE

*50. AQUINO, THOMAS DE ORD. PRAEDIC. [circa 1227–1274 A.D.] [Commentarius in libros Aristotelis de anima.] [F. 1a:] Incipiunt comentaria [sic] gloriosi | simi docto[r]is sancti. Thome de | aquino ordinis p[r]edicatoru[m] su | pe[r] libris aristotilis de anima. | [F. 62b:] Explicit commentum Sancti Thome de | aquino o[r]dinis p[r]edicato[rum] super lib[r]os | aristotelis de anima. Papia Imp[r]essum per Martinu[m] de laualle de mo[n]ferato. An | no christi. M.CCCC.LXXXVIIJ. die ultima men | sis setemb[r]is. | [Registrum.]

[62] ff F°. Papiae, Martinus de Lavalle de Monferato, 1488.
[Hain no. 1521.]

*51. AQUINO, THOMAS DE ORD. PRAEDIC. [circa 1227–1274 A.D.] Super Aristotelis libros de generatione et corruptione. [F. 1a:] Sanctus Thomas super libros | de generatione et corruptione. | Aristotelis cum textu. | [F. 2 Fr. Eugenii Bruti Ord. Praed. ep. Viro D[omi]no Aloysio Bono Practico Veneto inscripta. F. 3 incipit opus a prologo. F. 33b in fine:] § Explicit Aureum Opus diui Thome Aquinatis in li- | bros Aristotelis de generatione et corruptione fidissime | emendatum in conuentu Sanctorum Joannis et Pauli de Venetijs. Per Reuerendum Sacre Theologie pro | fessorem fratrem Eugenium Brutum Venetu[m] ordinis | predicatorum. | § Impressum Venetijs Mandato et expensis nobilis | Viri Domini Octauiani Scoti Ciuis Modoetiensis. | Per Bonetum Locatellum Bergomensem Anno salu | tis nonagesimo octavo supra Millesimu[m] quater[que] cen- | tesimum Undecimo kalendas Januarii Augustino. | Barbadico inclito Uenetiarum(sic). | [Registr. insign. typogr. c. litt. O. S. M. f. g. ch. c. f.]

33 ff. F°. Venetiis, Octavianus Scotus Modoetiensis per Bonetum Locatellum. Presbyter, Bergomensis, 1498.
[Hain no. 1535.]

*52. Aquino, Thomas de Ord. Praedic. [circa 1227–1274 A.D.] [Commentum in octo libros Physicorum Aristotelis.] [F. 1a. fig. xyl. rubro.] § Aristotelis stragyrite peripateticorum princi | pis de physico auditu textus libri primi. | [F. 111a:] Finis textus libri physicorum aristote | lis stragyrite. | § Expliciunt preclarissima commentari a diui Thome | Aquinatis ordinis predicatorum Aristotelis fidessimi co[m] | mentatoris in viii. libros physicorum: correctioni cum | ipsis textibus qua[m] diligentissimi tradita: summoque studio | singulariter ordinata per fratre[m] Theophilum cremonen | sem vite regularis eiusdem ordinis professorem Impressa | vero in inclita Uenetiarum urbe per Petrum Bergome[n]s | iem de quare[n]giis Anno a natiuitate domini. 1500. die ve | ro 22. aprilis. | [F. 112 vacat:]

[112] ff. 1 xylograph. F°. Venetiis, Petrus Bergomensis, 1500.
[Not in Hain.]
52a = 1g − 90

53. Arculanus, Joannes. [circa 1427–1484 A.D.] [Expositio in Avicennae canonis quarti fen primam.] [F. 1a. vacat. F. 2a. (sign.a^2) col. 1:] Joannis Herculani sui tempo- | ris medicoru[m] ac philosopho[rum] pri[n] | cipis expositio opti[m]a in quarti ca- | nonis Principis Fen prima[m] felici | ter incipit. | [F. 271b. col. 2:] *** diuinu[m] opus hoc ex[prop]rio ipsius originali | diligentissime extractu[m] in inclita Ferrarie | ciuitate impressum est die. 24. Januarij. | [Seq. 6 disticha in laudem auctoris; deinde:] Finis. | [F. 272a:] Registrum huius Libri. | [4 coll. F. 272b vacat.]

[272] ff F°. Ferraiae, Andreas Bellfortis Gallus, 1489.
[Hain no. 1552.]

*54. Ardoynis, Santes de, de pensauro. [circa 1400–1450 A.D.] [Liber de venenis.] [F. 1a:] Incipit liber de venenis quem magister santes de ardoy | nis de pe[n]sauro *** [ad finem:] Imp[r]essum Venetijs opera Bernardini ricij de nou- | ria *** M.CCCC.LXXXXIJ. Die xix. mensis | Julij. ***

[105] ff F° Venetiis, Bernardinus Rigus de Novaria, 1492.
[Hain no. 1554.]

*55. Argellata, Petrus de. [–1423 A.D.] [Libri sex chirurgiae.] [F. 1a tit.:] Cirurgia magistri Petri de largelata. | [F. 2a:] §Incipit liber p[ri]mus Cirurgie magistri petri de largelata | de bononia artium [et] medicine docto[r]is. | [F. 128b:] P[r]estantissimi artiu[m] [et] medicine docto[r]is magistri Pe- | tri de Largelata chirurgie finis. | §Venetijs ma[n]dato [et] expe[n]sis Nobilis viri D[omi]ni Octauia- | ni Scoti Ciuis Modoetie[n]sis. Octauo kalendas Marti- | as. 1497. Per Bonetu[m] Locatellu[m] Bergome[n]sem. |

[131] ff F°. Venetiis, Octavianus Scotus Modvetiensis per Bonetum Locatellum, Presbyter Bergomensis, 1497.
[Hain no. 1637.]

*56. Argellata, Petrus de. [–1423 A.D.] [Libri sex chirurgiae.] [F. 1a. tit:] Cirurgia magistri Petri de largelata | [F. 2a:] §Incipit liber p[r]imus Cirugie magistri petri de Large | lata de bononia artium [et] medicine docto[r]is. | [F. 131a:] *** Venetijs. 1499. die. 12. Septemb[r]is. |

[131] ff F°. Venetiis, [Johannes et Gregorius de Gregoriis de Forlivio,] 1499.
[Hain no. 1639.]

57. Aristoteles. [384–322 B.C.] [Opera graece.] Venetiis. M. 11 D. Mense iunio Apud Aldum, et hoc cum priuilegio. [f. gr. ch. c. f. et (excepto primo vol.) c. c. et ff. n. 30 l. Vol. I. 234 ff. Vol. II. 32 ff. non num. et 268 ff num. Vol. III. 457 ff num. et 9 ff non num. (c. vacuo). Vol. IV. 519 ff indicato modo num. Vol. V. 316 ff num., in medio 13 ff. non num. et in fine 1 f. non num.]

5v. F°. Venetiis, Aldus (Pius) Manutius, 1495–1498.
[Hain no. 1657.]
First edition. One of the earliest examples of books printed entirely in Greek characters.

58. Aristoteles. [384–322 B.C.] [Opera lat. cum commentariis Averrois.] [F. 1a. vacat. F. 1b. in superiore marg.:] Proemiu[m] Auerrois i[n] libros physico[rum]. | [F. 2a. (c. sign. a^2) rubro:] Aristotelis Stagyrite peripateticoru[m] | p[ri]ncipis de physico auditu liber p[ri]mus | [et] Auerrois Cordubensis Co[m]me[n]taria.| [F. 546b. post indicem contentorum:] Omnia Aris. opera cu[m] Co[m]me[n]to Auerrois. Impressa Uenetijs | Accurate ac Diligenter per Bernardinum de Tridino de Mon | teferato. Anno a Natali Cristiano. M.CCCC.LXXXVIIIJ. Nonis. | Septembribus. | [Deinde col. 2 registr. et rubra insign. typogr. f. maj. g. ch. maj. et min. c. f. textus in medio, comment. in marginibus, 72 l. text. 85 et 86 l. comment.]

[546] ff F°. Venetiis, Bernardinus Stagninus de Tridino de Monteferrato, 1489.
[Hain no. 1661.]

59. Aristoteles. [384–322 B.C.] [De generatione et corruptione liber.] [F. 1a vacat. F. 2a (c.sig.a2):] Textus Ar[istotelis] de generatione [et] corruptione cum | expositione omniu[m] expositio[rum] eius optimi inter-

petris | Egidij Romani Feliciter incipit. | [F. 32a:] Explicit expositio Egidii super pri | mum librum de generat[i]one Aristotelis. | [F. 54b:] Explicit textus Aristotelis de generatione | et corruptione una cum expositionibus Egi | dii de roma o[r]dinis heremita[rum]. | *** Impressum patauij. M.CCCC.LXXX. die XXIIIj.feb[r]uarij | i[n]genio [et] impensa Joannis gra[n]dis herbort [de] silgenstat. | [F.55 vacat.F. 56a:] Questiones clarissimi philosophi Marsilij inguen su | per lib[r]is de generatione et co[rr]uptione incipiunt. [F. 124b:] Expliciu[n]t q[uesti]o[n]es sup[er] lib[r]is de g[e]n[er]at[i]one et co[r]rupt[i]o[n]e Ari. | *** eme[n]date p[er] *** Nicoletu[m] vernia[m] theatinu[m] *** Anno d[omi]ni. M.CCCC.LXXX.die xxix. feb[r]uarii]. [Deinde tab.quaestionum et versus de emptore et Marsilio. Seq.3 ff. appendix et registr.]

[127] ff F°. Patavii, Johannes Herbort de Seligenstat, 1480.
[Hain no. 1692.]

*60. Aristoteles. [384–322 B.C.] [De meteoris libb. IV cum commentariis Caietani de Thienis.] [F. 1a (c.sign.a i j) rubro:] Aristoteles Stagirite Metheororum| liber primus: cum Co[m]mentarijs Gaietani | de Tienis. Nuper summa cum diligentia | emendatis. [F. 76b post tab. et registr.:] Expliciunt Co[m]mentaria super quattuor li- | bros metheororu[m] Aristotelis cu[m] textu eius- | dem: et duobus tractatibus de reactione: et *** remissio[n]e formaru[m] d[omi]ni Gaeta[n]i de | tienis vincentini aretium et medicine docto- | ris clarissimi: su[m]ma cu[m] diligentia castigata et | emendata per sacre theologie bachalarios | fratrem Franciscum de macerara et fratrem | Petrum angelu[m] de monte vlmi ordinis mi- | noru[m]. Venetijs i[m]pressa cura solertissimorum | viroru[m] Joannis de foriivio(sic) et Gregorij fra | trum Anno d[omi]ni. M.CCCC.LXXXXJ. die xxij. | Mensis octobris. Laus deo. | [Ult. f. s. insign. typogr.]

78 ff F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1491.
[Hain-Copinger no. 1697.]

*61. Aristoteles. [384–322 B.C.] [De natura animalium, etc.] [F. 1a. tit.:] ARISTOTELIS. | De natura animalium: libri nouem. | De partibus animalium: libri quatuor. | De generatione animalium: libri quinq[ue]. | INTERPRETE THEODORO GAZA. | [Ad finem:] FINIS. |

[151] ff F°. n. p., n. pub., [circa 1475.]
[Hain no. 1698.]

62. Aristoteles. [384–322 B.C.] [De natura animalium.] [F. 1a (c. sign. a^2):] THEODORI: GRAECI: THESSALONICEN | SIS: PRAEFATIO: IN LIBROS; DE ANIMA | LIBUS. ARISTOTELIS: PHILOSOPHI: AD | XYSTVM: QUARTVM: MAXIMVM. | [F. 249b:] Finiunt liber de animalibus Aristotelis interprete Theodoro | Gaze. V. clarissimo. quos Ludouicus podocatharus Cypri- | us ex Archetypo ipsius; Theodori fideliter et dilige[n]ter auscul | tauit: et formulis imprimi curauit Venetiis per Johannem | de Colonia sociu[m]q[ue] eius Johanne[m] ma[n]then de Gherretze[m]. Anno | domini. M.CCCC.LXXVI. |

[250] ff F°. Venetiis, Johannes de Colonia et Johannes Manthen de Gherretzem, 1476.
[Hain no. 1699.]

*63. Aristoteles. [384–322 B.C.] [Problemata.] [F. 1a. tit. litt. maj.:] Questiones natu | rales aresto[t]ilis. | De variis corporum humanorum disposit[o]ib[us] | audientibus ualde suaues. | [Infra icon. F. 1b alia icon. F. 2a:] § Incipiu[n]t questiones naturales arestotilis. | [F. 32b. In fine:] Imp[re]sse Antwerpie per me Godfridum Back. |

[32] ff 4°. Antverpiae Gottfridus Back, [1500.]
[Hain no. 1728.]

*64. Aristoteles. [384–322 B.C.] [Problemata.] [F. 1a:] Tractatulus propleuma = | tum [sic] Arestotelis multas | in naturalib[us] questiuncu = | las admiratione dignas | in se continens legentibus | multu[m] iucundus ac vtilis. | [F. 2a (c. sign. Aij):] §Incipiunt Propleumata Arestotelis. | [F. 35b:] Finiunt Propleumata Arestotelis. | Anno domini. M.CCCC.XCIIIJ. |

[35] ff 4°. [Lipsiae, Conradus Kacheloven,] 1494.
[Hain no. 1732.]

*65. Arnoldus de Villa Nova. [1235–1311 A.D.] [Breviarium practicae medicinae.] [F. 1a:] B[r]euiariu[m] p[r]atice excelle[n]tissimi Reinaldi | de uillanoua medici. *** [F. 100a:] Laus deo et suis sanctis. |

[12 ms. ff] & 101 ff F°. [Papiae, Antonius de Carchano, Mediolanensis, 1482.]
[Not in Hain.]

*66. Arnoldus de Villa Nova. [1235–1311 A.D.] [Breviarium practicae medicinae.] [F. 1a. tit.:] Practica medicine Arnal- | di de Uilla noua. | [F. 75a:] Uenetijs per Baptistam de to[r]tis. M.CCCC.XCIIIJ | die. xxi. Februarij. |

[76] ff F°. Venetiis, Baptista de Tortis, 1494.
[Hain no. 1801.]

*67. Arnoldus de Villa Nova. [1235–1311 A.D.] [Breviarium practicae medicinae.]

[F. 1a. tit:] P[r]actica medicine Arnal | di de Uilla noua. | [Ad finem:] §Epitoma Medice artis excellentissimi viri Arnaldi | de villa noua Imp[re]ssum Uenetijs per magistru[m]Otinu[m] | Papiensem de la luna Anno d[omi]ni. M.CCCCLXXXXVIJ. | xij. Kal. nouemb[r]is ***

[67] ff F°. Venetiis, Otinus de Luna, Papiensis, 1497.
[Hain] no. 1802.]

*68. Arnoldus de Villa Nova. [1235–1311 A.D.] [Liber de vinís.] [F. 1a:] [H]Ienach volget ein loblich tractat | ins fürriemen docto[r]s der ertzney | mitt namen Arnoldi de noua villa | *** Wilham vo[n] hirnkofen *** von latin zü teütsch tran[ss]feriert ***

[11] ff F°. [Norimbergae, circa 1478.]
[Copinger no. 655.]

*69. Arnoldus de Villa Nova. [1235–1311 A.D.] [De virtutibus herbarum s. Avicenna.] [F. 1a. icon xyl.:] ARNOLDUS DE NOVA VILLA AVICENNA. | § [I] Ncipit Tractatus de uirtutibus herbarum. | [F. 2a. l. 10:] CAPITVLA HERBARVM SECVNDVM ORDI- | NEM ALPHABETI. | [F. 4a (c. sign. a et n. 1) incipit opus:] [F. 153b. in fine:] § Finiunt Liber uocatur herbolarium de uirtutibus her- | barum. Impressum Vincentiae per Magistrum Leonar | dum de Basilea et Guilielmum de Papia Socios. Anno sa- | lutis. M.CCCC.LXXXXI. die xxvii. men[sis] Octob[ris]. | Deo. Gratias. | [F. 154 vacat. (?) F. 155–171. registrum.]

[171] ff 2 por. 4°. Vicentiae, Leonardus Achates, Basiliensis, et Guilielmus de Papia, 1491.
[Not in Hain.]

*70. Arnoldus de Villa Nova. [1235–1311 A.D.] [De arte cognoscendi venena.] [F. 1a:] TRACTATVS MAGISTRI ARNALDI | DE VILLA NOVA DE ARTE COGNOS | CENDI VENENA CVM QVIS TIMET | SIBI EA MINISTRARI. | [F. 16a:] Et sic est finis totius tractatus DEO GRATIAS: |

[16] ff 4°. [Mantuae, Johannes Vurster de Campidona, 1473.]
[Hain no. 1805.]

71. Ars memorativa. [F. 1a:] Ars memora |- tiva Ad com | memorandu[m] | Terminos Questio[n]es Argume[n] | ta siue Sermones quottas.: | [F. 4b:] Imp[r]essum in Ingelstat | Laus deo omnipote[n]tu. |

[4] ff il. 4°. [Ingolstadii, Johannes Kachelofen, circa 1493.
[Not in Hain.]

*72. [Articella.] [F. 1a tit.:] Artesela. | [F. 1b:] Gregorius a vulpe vincentinus Magnifico domino Marino Georgio. omni disciplina | rum genere eruditissimo. S. P. D. | [Ad calcem huj. ep.] Ista sunt. opera que in hoc preclaro libro continentur. | [F. 2a (c. sign. a^2 et n. 2.):] Incipiunt isagoge Ioannitij ad tegni Galieni. Pri- | mus liber medcine [sic] [In fine post registr:] Impressu[m] Uenetiis per Philippu[m] de | pinzis de Caneto Anno salutis d[omi]ni n[ost]ri ie | su [christ]i M.CCCC.LXXXXI. die xxvi septe[m]bris. | [Insign. typogr. c. litt. P. PHI. Ult. f. a:] Incipit tabula sup[er] libros Tegni que ordinata este [e]ode[m] ordine quo tabula posita supra an[te] libros p[róg]nostico. |

[194] ff F°. Venetiis, Philippus Pintius de Caneto, Mantuanus, 1491.
[Hain no. 1871.]

73. [Articella.] [F. 1a:] Articella [F. 2a:] §Incipiunt isagoge Joannitij ad tegni Galieni. P[r]imus | liber medicine. | [F. 186a:] Imp[r]essum Venetijs per Bonetu[m] Locatellum Bergo | mense[m] Iussu [et] expensis Nobilis Uiri Octauiani Scoti | Ciuis Modoetiensis. Anno Intemerate Uirginis par | tus. Nonagesimotertio sup[r]a Millesimum [et] quadrin- | gentesimum. Tertiodecimo kalendas Januarias. Cum | Benedictione Omnipotentis dei q[ui] est benedictus In | secula seculo[r]um. Amen. |

[144] ff + [51] ff F°. Venetiis, Octavianus Scotus Modoetiensis per Bonetum Locatellum, Presbyter Bergomensis, 1493.
[Hain no. 1872.]

*74. Auctoritates, Aristotelis. [etc. F. 1. tit.:] Propositiones Aristotelis. | [F. 2a (c. sign. a i j et n ii):] Index operis. | [F. 3a l. co. 2:] Finis indicis opusculi. | [F. 4a:] Incipit prologus huius libri. | (a) Ristoteles patrem Nicoma | chum medicine artis peritis | simu[m]; [etc. F. 42 a col. 1:] Auctoritates auree et propositio- | nes diuine[quem] plurimoru[m] philosophorum bene | em[en]date finiunt. | Venetijs. | Laus Deo. | [Registr. s. a. 4. g. ch. c. f. et ff. n. 2 col. 45–49 l.]

42 ff 4°. [Venetiis, circa 1490–1495.]
[Hain no. *1924.]

*75. Augustinus, S. Aurelius. [354–430 A.D.] Sermones ad Heremitas, etc. [F. la tit.:] Sermones san| cti Augustini ad | heremitas. | [F. 2. tab. F. 3a (c. sign. A3:] Incipiunt ser- | mones sancti Augustini ad heremitas et no[n]nulli ad sacre | dotes suos: ad aliquos alios. | [etc. Term. f. 108a col. 2. l. 8:] Explicit. | [s. l. a. et typ. n. 4. g. ch. c. f. 2 col. 34 l.]

[108] ff 4. [Argentorati, Martin Flach, s. Simus Basiliensis, circa 1475.]
[Hain no. 1997.]

[Gesamtkatalog der Wiegendrucke no. 3002 says Strassburg (Argentorati), Johannes Prüss (Pryss), nicht noch 1487.]

*76. Augustis, Quiricus de, [circa 1350–1450 A.D.] Lumen apothecariorum. [F. 1a tit.:] Lumen Apothecarioru[m] cu[m] | certos expositionibus no | uiter impressum. | [2F. bf. tab. 2a (c. sign. a i j):] § Incipit libellus in titulatus lumen apothecario[rum] | Editus a subtilissimo artiu[m] medicine doctore do | mino magistro Quirico de Augustis de terdona. | [F. 38a post ep. supra citatem:] § Habes candidissime lector opus aurem: Sum | ma cura et diligentia i[m] pressum venetijs per Joanne[m] | Gregoriu[m] de gregorijs fratres Anno salutifere incar|nationis domini. M.CCCC.XCV. die xxij. septe[m]bris | Finis. | [f. g. ch. c. f. c. et ff. n. inde a 19. 38. 2 col. 65 l.]

[2], 38 ff F°. Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1495.
[Hain no. 2120.]
[Manuscript notes.]
[Bound in ancient musical manuscript on vellum.]

*77. Aurelius Victor, Sextus. [circa 320–380 A.D.] De viris illustribus Romae s. Vitae Imperatorum. [sub nom. Plinii. Praeced 2 ff. tab. c. inscr:] Tabula. [et subscr:] Finis. | [F. 3a:] PLINIUS PRIMUS DE PRAECLA- | RE GESTIS ROMANO RUM. | [F. 34a. In fine:] EXPLICIT PLINIVS PRIMVS. DE | REBVS PRAECLARE GESTIS VI- | RORVM ILLVSTRIVM ROMA- | NORVM. | [s. l. a. et typ. n. 4. r. ch. s. f. c. et pp. no. 24 l.]

[34] ff. 4°. [Venetiis, Nicolaus Jenson, 1471.]
[Hain-Copinger no. 2131.]

*78. Ausonius. [circa 310–395 A.D.] Opera| [F. la tit.:] AVSONII PEONII POETAE . DISERTISSIMI EPI | GRAMMATA. [F. 1b: Ep. excip. Ausonii vita et tabl., quae term. f. 4b e. 23. F. 5a (c. sign. B) incipit lib. I. Ausonii. F. 41b. In fine:] Expliciunt ea Ausonii fragmenta quae inuida cun | cta. corrodens uetustas ad manus n[os]tras uenire [per] misit. | Venetiis impressa per magistrum Ioannem de Cereto | alias Tacuinem de Tridino. Anno domini M. CCCC. | xciiii. die XI. Augusti. | **Τελοσ.** [Deinde tetrastichon; *αυσομιοσ* fueram solus: etc. Ult. f. a. registr. et insign. typogr. c. litt. Z. T. f. r. ch. c. f. 44 l.]

[42] ff. F°. Venetiis, Johannes de Cereto de Tridino al. Tacuinus, 1494.
[Hain no. *2178.]
[MS. Latin verse in praise of Ausonius added at bottom of page 41b.]

Avenaris
See—Aben Ezra (R. Abraham)

*79. Avenzohar, Abhumeron. [–1162 A.D.] [Theicrisi dahalmodana vahaltadabir c. Colliget Averrois.] [ff 1–44 desider.] [F. 45a. tit.:] Colliget Auerroys. | [F. 46a. c. sig. a. ij et n. 2] Incipit liber de medicina Auerrois: | qui dicitur colliget. [etc] [F. 84. c. n. 40:] Explicit liber Auenzoar. | [ff 85–108 desider.]

[108] ff F°. [Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1490.]
[Hain no. 2186.]
Imperfect. ff 1–44, 85–108 missing.

*80. Avenzohar, Abhumeron. [1162 A.D.] [Theicrisi dahalmodana vahaltadabir c. Colliget Averrois.] [F. 1a. tit:] Abhumeron Abynzoar | Colliget auerrois. | [F. 42b:] §Hieronymus Surianus physicus domini magistri Jacobi suriani de Arimino | Artium ac medicine docto[r]is p[r]eclarissi [sic] fili[us] Lecto[r]i Salute[m] plurimam dicit. | *** [F. 43a:] §Incipit liber de medici[n]a Auerroys: qui dicitur colliget: | *** [F. 102b:] *** Imp[r]essum Uenetijs per magistrum Otinum papiensem | de luna. Anno domini nostri iesu ch[r]isti. MCCCCXCVIJ. de | cimo kalendas ianuarias. ***

[103] ff F°. Venetiis, Otinus de Luna, Papiensis, 1497.
[Hain no. 2188.]

Averroes Cordubensis Colliget
See—Avenzohar, Abhumeron.

*81. Averroes Cordubensis. [1126–1198 A.D.] Destructiones destructionum. [F. 1a tit.:] Destructione destructionu[m] | Auerroys cu[m] | Augustini niphi de Suessa expositione. | Eiusde[m] Augustini questio de sensu age[n] te. | [F. 2a (c. sign. a 2 et n. 2):] § Destructiones destructionu[m] Auerroys co[n]- | tra Algazele[m] cum expo[sitio]ne *** | [Term. f. 123b. F. 124a seq. tractatus de sensu agente. F. 129a:] § Explicit tractatus de sensu editus ab Augustino | Niffo de Suessa philosopho preclarissimo. Padue lege[n] | ti philosophia[m] completus. i 5. Maij. 1495. | § Impressus venetijs mandato et expensis Nobilis Uiri | Domini Octauiani Scoti ciuis Modoetie[n] sis. Per Bo | netum Locatellum Bergome[n] sem Kalendis Martijs | 1497. | Laus! Deo. |

129 ff F°. Venetiis, Octavianus Scotus, Modoetiensis, per Bonetum Locatellum Presbyter Bergomensis, 1497.
[Hain no. 2190.]

82. Avicenna. [980–1037 A.D.] Canonis libri. [F. 1a:] Liber canonis p[r]imus quem p[r]inceps

aboali | abinsceni de medicina edidit: translatus a magistro | Gerardo cremonensi in toleto ab arabico in latinu[m] | Uerba aboali abinsceni. | [F. 491a:] Expletus est libellus de viribus co[r]dis quem | p[r]inceps Auicen[n]a edidit. Imp[r]essus Venetijs An |-no incarnationis Dominice. M.CCCCLXXXVI. |

[500] ff 4°. Venetiis, [Petrus Maufer Gallicus, 1486].
[Hain no. 2205.]
Imperfect. ff 347–446 missing.

83. AVICENNA. [980–1037 A.D.] [Canonis libri V.] [F. 1 vacat. F. 2 (c. sign. a. ij):] § Liber canonis primus quem princeps aboali ab | insceni de medicina edidit. tra[n]slatus a magistro Ge- | rardo cremonensi in toleto ab arabico in latinu[m]. Ver | ba aboali abinsceni. | [F. 441 a in fine.] § Regis aboali hassem filii hali abinsceni liber tot[ius] | finitus est vna cum tractatu de viribus cordis transla | to ab Arnaldo de vilanoua. Impressus et diligentissi | me correctus ma[n]dato et impensis noblilis viri Octa | uiani Scoti ciuis modoetiensis. Venetiis. Anno sa- | lutis. M.CCCCXC. die 24. Martij. |

[441] ff 4°. Venetiis, Octavianus Scotus Modoetiensis per Bonetum Locatellum, Presbyter Bergomensis, 1490.
[Hain no. 2206.]

*84. AVICENNA. [980–1037 A.D.] De animalibus. [F. 1a tit.:] Auice[n]na de a[n]i[m]alibus per | magistru[m] michaele[m] sco | tu[m] de arabico in la | tinu[m] translatus. | [F. 2a (c. sign. aii et n. 2):] INCIPIT liber de a[n]i[m]alibus Auice[n]nae super libros de a[n]i[m]alibus Aristotelis tra[n]slatus ab Ara | bico in latinu[m], per magistrum michaelem scotum, federico domine mundi Imperator, su | scipe deuote hunc librum Michaelis scoti, ut sit gratia capiti tuo, et torques collo tuo. | [F. 54b. in fine:] Explicit liber de animalibus Auicennae decimus nonus & ultimus. | [Registr. s. l. a. et. typ. n. f. r. ch. c. f. c. (in fine quatern.) et ff. n. 55 l.]

[54] ff F°. [Venetiis, Johannes et Gregorius de Gregoriis de Forlivio, 1500.]
[Hain no. 2220.]

*85. AVIENUS, RUFUS FESTUS. [circa 300–350 A.D.] [Opuscula.] [F. 1a (c. sign. a i i):] Victor pisanus Magnifico ac singularis prudentiae uiro | Paulo pisano senatori Veneto. S.P.D. | [F. 2b hanc ep. excipit notitia:] Hic codex auienii co[n]tinet epigra[m]ma. eiusde[m] arati phaenome- | na geographia[m] carmine heroico: & oras maritimas trimetro | iambico: germanici quoque: & marci tulii arati fragmenta: & | Sereni uersus curandis morbis. | [F. 3a (c. sign. a i i i i): RVFVS FESTVS AVIENVS. VC. FLAVIANO MYR | MEICO. VC. SVO SALVTEM | [F. 56a:] RVFI FESTI AVIENII OPERA FINIVNT. [F. 119a:] Liber medicinalis quinti sereni finit. | Hoc opus impressum Venetiis arte & ingenio Antonii de | strata Cremonensis. Anno salutis. M.CCCCLXXXVIII. octauo ca | lendas nouembres. | [Registr. Eod. f. b:] Victor pisanus ad paulum pisanum opere co[m]monito.

119 ff. il. 4°. Venetiis, Antonius de Strata, Cremonensis, 1488.
[Hain no. 2224.]

*86. BAGELLARDUS À FLUMINE, PAULUS. [circa –1441.] [De infantium aegritudinibus et remediis.] [F. 1a:] AD Illustrissimum principem do | minum Nicolau[m] Tronu[m]. dignissimu[m] | ducem Ueneciarum dominu[m] suu[m] p[rae] | cipuu[m]. *** [F. 21b:] Finit per b[r]eue opusculum de infantiu[m] | infirmitatibus remedijsq[ue] ea[rum]. Editu[m] per egregium ac famosissimum artiu[m] [et] medicine docto[r]e[m] m[a]g[ist]r[u]m Paulu[m] bagel | lardu[m] a flumine: [et] imp[re]ssus die. 10. noue[m] bris. p[er] p. matheu[m] [de] vindischg[r]etz. 1. 4. 8. 7. |

[22] ff 4°. [Patavii], Matthaeus Cerdonis de Windischgraez, 1487.
[Hain no. 2245.]
Second edition of first book on diseases of children.

*87. BAPTISTA MANTUANUS, CARMELITA. [1448–1516 A.D.] [De patientia aurei libri tres.] [F. 1a. tit.:] Baptiste Mantuani | Carmelite: de patientia | aurei libri tres. | 1499. | Nihil sine causa: | Olpe. | [F. 118a. l. 10:] Impressum Basilee opera Ioha[n]nis Bergman de Olpe. | xvi. k[a]l[endas] septe[m] bres. Anno salutis. MCCCCLXXXXIX. princi | pante diuo Maximiliano cui salus & victoria. Amen. | [Seq. Sebast. Brant carmen ad Wimmar de Erklens.]

118 ff 4°. Basileae, Johannes Bergmann de Olpe, 1499.
[Hain-Copinger no. 2407.]

(*To Be Continued*)

[From Trattato di Christoforo Acosta Africano, Venetia, 1585.]

EDITORIAL

REPORT UPON THE

EIGHTH CONGRESS OF THE INTERNATIONAL SOCIETY OF THE HISTORY OF MEDICINE, ROME, 1930*

THE Eighth Congress of the International Society of the History of Medicine was held at Rome between the 22nd and the 27th of September, 1930. At the Sixth Congress in 1927 at Leyden-Amsterdam, Rome was selected as the place of meeting of the Seventh Congress, but a Reunion at Oslo in 1928 was considered as a Congress and called the Seventh so that the Rome Congress was actually the Eighth of this organization.

The opening meeting of this Congress was held in the great hall of the Palace of Senators at the Capitol (Figs. 1 and 2). This meeting was attended with much ceremony and was made the occasion of short addresses by the Minister of Education, the Governor of Rome, and the President of the Executive Committee of the Society, Doctor Pietro Capparoni.

At 12:30 P.M. on September 22, the members of the Congress and their families were accorded a special audience by Pope Pius XI. They assembled at the Bronze Door of the Vatican and were ushered into a great hall in which, with a few words of instruction from an executive, they arranged themselves in single formation around three walls of the chamber. The fourth, that on the side from which the Pope was to enter was occupied by a small throne. The Pope entered near this platform and accompanied by Dr. Capparoni and one or two aides, made the circuit of the chamber, having a few words of conversation with many of those present. As he approached each group the visitors would kneel and kiss the hand he presented. When he had passed along, the line would rise. Having made the circuit in this manner, he sat down on the throne and talked to those present for about half an hour, the Congressists remaining standing. He spoke first in French, but upon asking what the official language of the Congress was and being told it was Italian, gave the balance of his address in that language. Those who understood, said that his remarks had to do with certain features of medical history and that they showed much learning and much sympathy. For formal audiences of this kind the dress is prescribed, and though it was the middle of the day the men had to appear in swallow tailed coats and white vests.

At 5:30 P.M. on September 22, the Governor of Rome received those in attendance upon the Congress at the Palazzo dei Conservatori or Palace of the Town Council. This and the nearby Museo Benito Mussolini, to which the Congressists were also admitted, contain innumerable objects of art collected and purchased. This reception was quite an enjoyable and profitable one and ended the program of the Congress for its first day.

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* Published by permission of the Surgeon-General, United States Navy.

FIG. 1.

On September 23 at 9:00 A.M. the three sections into which the program was divided met together and listened to a report by Professor E. Jeanselme upon the question of "How Europe protected herself against leprosy in the Middle Ages." This report was discussed rather fully and at 11:00 A.M. the three sections (A, B, and C) met separately for the reading of the respective papers assigned to each. In carrying through the work of the Congress, some seven or eight languages, including Latin, were used. As the writer, aside from English, understands only a little German and less French of the foreign tongues, it was decided that it was impossible to give even a meager idea of the ground covered by the large number of papers presented.

At 2:30 P.M. on this date (September 23), the members of the congress were gathered into motor busses and started upon a trip to Lake Nemi to visit the Ship of Caligula. This Lake is about twenty miles from Rome in a southeasterly direction. The lake is 1045 feet above sea level, three and one-half miles in circumference, and 110 feet deep. It is volcanic in origin. The town of Genzano from which the descent to the lake is made is situated some 500 feet above the lake surface. The Italian Government has uncovered one of the two ancient boats known to rest on the bottom of this little lake. By drainage the surface of the lake has been lowered 50 to 75 feet which permitted of elevating the boat upon a cradle. Here it is in process of being repaired, so that it may be drawn out to a higher level and put under cover for preservation. Visitors were not allowed on board nor could they go further towards the stern than about the mid-portion of the vessel. She was of considerable size, evidently constructed of the pine wood of the vicinity.[1] The ship was without any means of propulsion or of steering. The hull was sheathed outside with lead held in place by large-headed copper nails covered with the same metal (lead). Many interesting pieces of equipment are preserved on shore presumably for restoration to the vessel when in her final position. Bronze lions' heads held the anchoring tackle by means of large rings behind their half-closed teeth. The anchor, much lead piping and many terracotta slabs and other equipment placed on the boat over 2000 years ago, are there to be seen. The lead piping bears the name of Caligula (Emperor 37–41 A.D.). "But these floating palaces are generally ascribed to Tiberius, his predecessor (14–37 A.D.)." This boat is not nearly so interesting as are the two Viking ships of Oslo, though almost 1000 years older. It *does* show hull construction of 2000 years ago. However, the household equipment for the time of Tiberius is well known from other sources. This vessel was only a houseboat, while the Norwegian ships are actually seagoing ships of the 9th and 10th centuries.

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[1] See article entitled "The Roman Ships of Nemi and the Wood Used in Their Construction 2000 Years Ago" by Dr. Aldo Pavari in *American Forests and Forest Life,* September, 1930.

On September 24 the sections met together in the Corsini Palace where all the scientific sessions were held, and listened to the report by Dr. A. Castiglioni, "The cultural relations in respect to medicine and the natural sciences between Italy and other European States during the 16th and 17th centuries." After a discussion of this paper, the Congress at 11:30 adjourned to the Regia Biblioteca Casanatense, where there were on display manuscripts, incunabula and many rare books connected with medicine.

FIG. 2.

The afternoon of September 24 was devoted to the papers of the three sections up to 4:30, at which hour a visit was made to the Pio Istituto S. Spirito in Sassia and the visitors were shown through the Lancisiana Library and the new scientific laboratories of the hospital.

At 8:30 P.M. on this date the official delegates to the Congress, about 100 in all, were entertained at dinner by Professor Pietro Capparoni, President of the Executive Committee of the Congress, at the Casina delle Rosa.

The occasion was a pleasant one. There was much good Italian food and very little speech-making.

Fig. 3.

The 25th of September was entirely devoted to a trip to the ancient Abbey of Monte Cassino. This was founded by St. Benedict in 529 and according to Baedeker was famed as a seat of learning through the Middle Ages. It is now an ecclesiastical educational establishment. The town of Cassino is 86 miles from Rome and the Abbey is situated on a mountain some 2000 feet above sea level and overlooks the beautiful valley in which the town is situated. The purpose of this excursion was to present to the Abbey Monte Cassino a bronze tablet from the Congress in appreciation of the Monastery's services to medicine during the Dark Ages. (See Fig. 3.) The members of the Congress were shown through the Monastery and given an excellent luncheon. After this the official delegates to the Congress met to elect the next President of the International Society of the History of Medicine. Professor D. Giordano of Venice was elected to this office.[1] The members then started on the return trip, arriving at Rome about 8:30 P.M.

The 9:00 A.M. meeting of the Congress on September 26 took place in the library of the National Medico-Pharmacological Institute Serono on the outskirts of the city. The seance was opened by a report "Upon the necessity of making obligatory the study of the history of medicine in the universities." This was given by Professor Ladislaw Szumoswski and was followed by a discussion. At 11:00 o'clock the members of the Congress were shown through the institution, returning to their hotels for luncheon.

At 2:30 P.M. the program was continued at Palazzo Corsini by the reading of papers in the several sections.

At 5:00 P.M. the members of the Congress met at the monument of Victor Emanuel II to place a wreath upon the tomb of an Unknown Warrior buried at the base of this gigantic equestrian statue. (See Fig. 4.)

At 5:30 P.M. the program for September 26 was concluded by a visit to the Palais des Filippini where a reception was given for those visiting the Congress by the President of the Reale Societa Romana Di Storia Patria in the Biblioteca Vallicelliana.

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[1] His full address is: Prof. Gr. Uff. Sanateur Davide Giordano; 1574 San Leonardo, Venice.

The Congress was concluded by a banquet in the evening of September 27. The morning and afternoon sessions were devoted to the reading of papers. Bucharest, Rumania, was selected as the place of meeting for the Ninth Congress in 1932, and Dr. Victor Gomoiu of that city was chosen as the local president.[1]

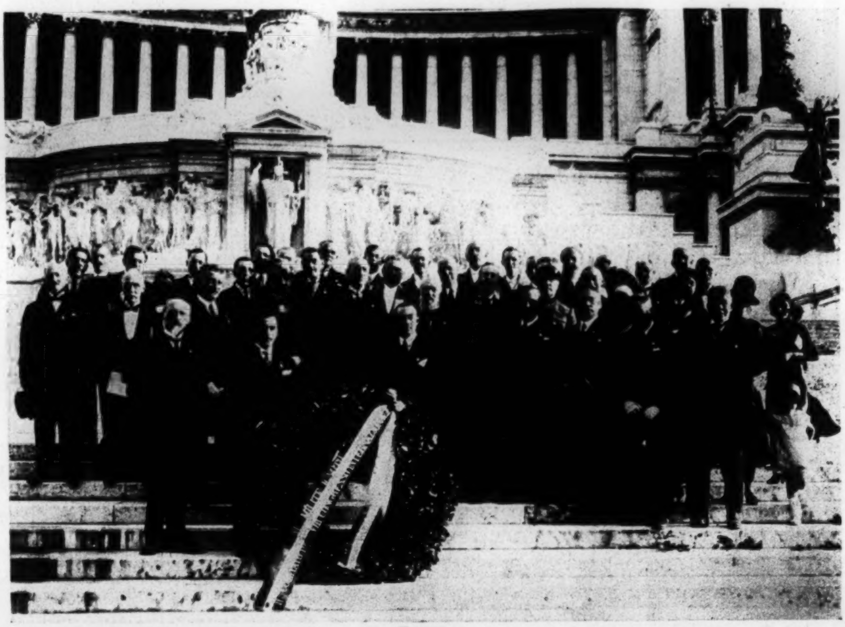

FIG. 4.

It was necessary for the writer to leave at noon on the 27th and before the Congress was finished in order to catch the steamer sailing from Naples on the morning of September 28.

Captain Frank L. Pleadwell, (MC), United States Navy, retired, was with the writer in attendance upon all the seances of the Congress. His experience at other European Congresses was of great assistance to the official delegate.

There were perhaps six or eight physicians from the United States in addition to Captain Pleadwell and myself who attended the Congress. It was the opinion of all of these, I believe, that the Italian officials, both those of the Congress and of the Government, did everything in their power to make the Congress both pleasant and profitable to those in attendance upon it. We feel it our duty to say that Professor Dr. Pietro Capparoni, President of the Executive Committee of the Congress, left nothing to be desired in both courtesy and efficiency to this end.

C. S. BUTLER,
Captain, M.C., U. S. N.
Commanding

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[1] Dr. Gomoiu's address is 88 Rue Stirbei Voda.

BOOK REVIEWS

TAIT McKENZIE. A Sculptor of Youth. By Christopher Hussey. Philadelphia, J. B. Lippincott Co., 1930.

Leonardo da Vinci was primarily an artist and sculptor. His interest in anatomy was developed as an auxillary to his artistic work. McKenzie's technical training reverses that of Leonardo da Vinci in that it was that of an anatomist and his artistic development had as a background his knowledge of human anatomy and remarkable opportunities to study the human form in action as Director of Physical Education at McGill and the University of Pennsylvania. As Hussey says, "Probably no man filled with the aesthetic impulse has, since the days of the Greeks, seen pass before his eyes so long and varied a procession of men in the nude as he has during the physical examinations that he has conducted for the last thirty years." Hussey divides McKenzie's artistic career into two parts; the first deals with the years in which he was almost entirely occupied with the sculpture of the athletic form in action. The second part takes up his work since the Great War, much of it consisting of War Memorials but including also much valuable work on other lines, especially as influenced by the Great War. The division is a good one because in the nature of events that historic episode marks a sharp differentiation in its characteristics.

The son of a Scotch minister of a small parish in Canada, McKenzie after completing his school years entered McGill at the age of eighteen and worked his way through the subsequent years of his university life, graduating in medicine in 1892. When he began his studies at McGill his lack of physical development barred his way to participation in athletics. This handicap he overcame by serious work at self-development until by the end of his second year he had won the All-round Gymnastic Championship and before graduating played on the football team and won the Inter-Collegiate High Jump Championship. The work which he did in the perfection of his own physical development was to prove of great value in his subsequent labors towards the regeneration of others.

In 1891 McKenzie was appointed assistant instructor in the gymnasium at McGill, and the following year was given entire charge of physical education at the University. In 1894 the post of Medical Director of Physical Training was created and the position given to him. A few years later he became Demonstrator and Lecturer on Anatomy in the Medical School. All of the work of these years moulded his artistic development. In 1900 McKenzie first turned his attention to modelling and shortly afterwards brought forth his first notable artistic achievement, the four masks of the face showing its expression in Effort, Breathlessness, Fatigue and Exhaustion. Following this initial success McKenzie began his work as a sculptor in the round and produced "The Sprinter," which was hailed with acclaim by the artistic world, and at once established his position in sculpture. It is impossible to describe McKenzie's continuous series of triumphs in the depiction of the athletic form both in various forms of action and in repose. The statues and medals of the years which followed have most of them been reproduced in such numbers as to render the majority familiar to all.

In 1904 McKenzie accepted the position of Professor of Physical Education in the University of Pennsylvania which he has held until the present year. In Philadelphia there may be seen several notable examples of his work in another field than that of athletics, statues such as those of Benjamin Franklin and Dr. Edgar Fahs Smith.

With the Great War came new opportunities. McKenzie got leave of absence from the University and going over to England received a commission as a lieutenant in the R.A.M.C. It was not long before his special gifts were recognized and he was put on the staff and assigned to the special duty of organizing methods for improving the physical condition of recruits and giving remedial training to men who had been rendered unfit during army service. Naturally in a book dealing with the artistic aspects of his life McKenzie's invaluable army service is not given the extended attention which it merits. He was later transferred to Canada for the same kind of duty, and when the United States entered the War his services were utilized by its government. During his army service McKenzie came in close contact with many new aspects of life and in 1915 he modelled the figure of a Scotch soldier "Blighty" which has won well-deserved popularity. This was the first of the war sculptures and it has been followed by many. In England, Scotland, Canada and the United States are many striking memorials in all of which McKenzie manifests the depth of feeling, catholicity of interest and fine instinct which renders them of such wide appeal. We cannot attempt to enumerate them in the space of a review. Hussey has studied them and the reproductions in his pages bring them vividly before us.

This book is a splendid tribute not only to the artist but to the man who is its subject. It is given to few nowadays to touch life and achieve distinction in so many aspects. Our profession may well be proud of the achievements of one who while perseveringly attaining distinction by his distinctly professional work has won for himself immortal fame as one of the most eminent sculptors of his day. Mr. Hussey's book is delightfully written and copiously illustrated with excellent reproductions of McKenzie's work.

Francis R. Packard.

Nosography. The Evolution of Clinical Medicine in Modern Times. By Knud Faber, M.D., LL.D. Ed. 2, revised. New York, Paul B. Hoeber, Inc., 1930.

A second edition of this interesting work is welcome as it is a book which should be kept alive. The author studies the answer to the questions: What is a disease? How have our conceptions of disease arisen and how have they been altered and developed? He points out that there have been two main thoughts in clinical medicine. The one endeavors to assemble symptoms and disturbances into separate entities with a definite etiology and course. Sydenham was the first great exponent of this view. The other pays little attention to "diseases" as such but rather to disease, that is to disturbances of visceral function. There are advantages in both and very evident disadvantages if too exclusive attention is given to one or the other.

The history of the development of nosography is traced with an account of the different attitudes of various schools to the conception of disease. The remarkable erroneous elevation of disturbances of function into supposed diseases is well illustrated by certain conceptions of digestive disorders. This error was in no small degree aided by a neglect of morbid anatomy. Today in some quarters the same error is being made with regard to certain cardiac disorders. Disturbed function is magnified unduly and organic change is disregarded.

This is a stimulating volume and is worthy of attention by all who do some thinking as to their attitude towards disease. The study of errors made by our predecessors may save us from similar mistakes but few are ready or able to profit by the lessons of history.

Thomas McCrae.

CLIO MEDICA. V. PHYSIOLOGY. By John F. Fulton, M.D. New York, Paul B. Hoeber, Inc., 1930.

This volume maintains the high standard set by the previous ones in this series. The author has given us a fascinating story of the development of physiology. After some discussion of the ancients, especially Aristotle and Galen, he discusses more particularly three main subjects, the circulation, respiration and digestion. The account of the development of our knowledge of the circulation is given in considerable detail and in a most interesting way. Perhaps for pure interest in the history of the development of our knowledge of one function that concerning respiration takes first place. The discussion of digestion is carried as far as Claude Bernard. The chapter on physiology in the nineteenth century gives short notes on many of the physiologists of this period and an account of the development of the teaching laboratories.

There is a discussion of the trends in physiology and of the special fields which are being intensively cultivated. It seems probable that the divisions will become more accentuated in the future. We heartily approve of the author's hope that physiology will continue to treat the organism as a whole and not be divided into compartments. The same unfortunate tendency is seen in internal medicine with the establishment of many departments, each dealing possibly with one organ. Something is gained but much is lost by this. Both physiology and medicine should strive to keep alive the study of the individual as a whole. This volume can be heartily recommended to students and to physicians who are making their first efforts to learn something of the history of medicine.

THOMAS MCCRAE.

THE ANTIQUITY OF HINDU MEDICINE AND CIVILISATION. By D. Chowry Muthu, M.D., Ed. 3, New York, Paul B. Hoeber, Inc., 1931.

The antiquity of Hindu civilisation and medicine as represented in this book must come as a surprise to the majority of Western minds, as the story of Aryan life and civilisation is carried back to prehistoric times and even to geological epochs. The idea that much of our knowledge is derived from Greece finds no support here but on the contrary it is suggested that the origin goes back much further to Aryan sources. The invention of numerical figures, the decimal system, algebra and geometry are said to belong here and also a high degree of knowledge of astronomy. Other early discoveries were the atomic theory, the theory of gravity, the differential calculus, the calculation of eclipses, the game of chess and many others. The Hindu system of medicine known as Ayur Veda is said to go back to 4000 B.C. Among methods stated to have been used is the employment of forceps in obstetrics (many centuries B.C.). The circulation of the blood is stated to have been discovered a century before Harvey. One wonders why so many of these discoveries were lost. About 800 A.D., Indian medicine exercised a profound influence on Arabian medicine, many works being translated into Arabic, and through this channel ultimately affected medicine in Europe.

To speak with authority as to the justice of many of these claims is beyond the power of the reviewer. The reader will be surprised at the extent of the claims made and should be stimulated to consult some of the sources mentioned.

THOMAS MCCRAE.

LEONARDO DA VINCI THE ANATOMIST (1452–1519). By J. Playfair McMurrich, Prof. of Anatomy, Univ. of Toronto. Published for the Carnegie Institution of Washington by the Williams and Wilkins Company, Baltimore, 1930.

In a short preface to this most valuable piece of research Dr. George Sarton points out that Leonardo's outstanding contribution to anatomy was his demonstration of the necessity and value of direct observation. His notebooks are filled with drawings from nature made by himself and with records of what he actually observed. For this reason for the task of investigating his anatomical studies and determining their value the services of a skilled anatomist are of the greatest importance.

Professor McMurrich's work is not a biography of Leonardo, but a study of one of the most important aspects of his work, and he only gives such biographical details as are necessary to a comprehension of his anatomical studies. An illegitimate child, Leonardo was apprenticed to Verrochio, the Florentine artist, and probably was stimulated to the study of anatomy by his master, who believed that a study of the surface musculature was necessary for the correct delineation of the nude. Thus, as McMurrich points out, Leonardo approached the study of anatomy primarily as an artist. Later he became deeply interested in anatomy as a separate study which led him into research work in the mechanics and physics of the structures and functions of the human body.

The history of Leonardo's manuscripts is one of the curiosities of literature. Although he stated that he intended to write a book of anatomy, he died without having achieved his purpose. He was left-handed, and wrote his notebooks in what is called mirror-writing, writing from left to right. During his lifetime Leonardo gave some of his notebooks to various friends, and at his death bequeathed the remainder to Francesco Melzi. In the course of years they became scattered and lodged in various public and private collections throughout the world. Although there were occasional publications of some of Leonardo's sketches, it was not until 1883, when Richter published a quite large number of them, that it was realized how great a wealth of these treasures was available. Since then there have been published several series of works so that now almost all of Leonardo's original notebooks have been reproduced. Thus the opportunity is afforded for a complete study of Leonardo's anatomical researches and for assigning to him his due position as an anatomist.

A most notable feature of Professor McMurrich's book is the author's thoroughness and impartiality. In his introductory chapter he states that, "Vesalius was undoubtedly the founder of modern anatomy—Leonardo was his forerunner, a St. John crying in the wilderness," and he disposes in a few paragraphs of Jackschath's assertion that the *De fabrica corporis humani* was the work of Leonardo and not of Vesalius, showing its complete falsity. As stated above Leonardo mentions several times in his notebooks his intention to write a book on anatomy, but he never carried out his project and his anatomical researches remained unknown to the world for three centuries.

Chapter II is a very complete review of anatomy from Galen to Mondino. From the death of Galen at the end of the second century, "for nearly thirteen centuries scarcely a single fact was added to the knowledge of the structure of the human body." In 1316 there appeared the book on anatomy by Mondino de Luzzi, which for two centuries was the standard textbook on the subject. Mondino actually dissected human bodies, and we know that the practice gradually increased throughout Italy during the fourteenth century. By the latter half of the fifteenth century practical anatomy was taught on the human body quite universally in the Italian universities. McMurrich states that the reasons that so little was added to the knowledge of human anatomy until Vesalius were several. In the first place bodies putrefied rapidly, especially so in a warm climate like that of Italy, and there were no methods of preserving them by injection. Secondly the method of instruction was totally inadequate. The professor was seated in a high chair, from which he lectured or read, while a demonstrator, or *ostensor* pointed out with a wand, the parts as they were dissected by a surgeon or barber. What a change was wrought by

Vesalius may be appreciated if we look at the frontispiece of his great work and see him depicted doing the actual dissection himself amidst a throng of animated spectators. Chapter III discusses the literary sources of Leonardo's knowledge and McMurrich concludes that aside from Mondino and Avicenna his knowledge of any writings on anatomy was very slight. He uses Arabic terms, such as *myrach* for abdomen, *meri* for esophagus, *sifac* for peritoneum, just as they are found in both these authors.

A most interesting chapter reviews the subject of anatomical illustration before Leonardo, comparing his wonderful drawings with attempts at the delineation of similar parts of the body by previous anatomists. McMurrich reproduces illustrations of Mondino from the "Fasciculus medicinae" (1492); of Heironyomus Brunschwig, from the "Book of Cirurgia" (1497), of Peylegk, from the "Philosophae Naturalis Compendium" (1499), and of Magnus Hundt from his "Anthropologium de hominis dignitate" (1501), showing the so-called "situs figure," which illustrates the thoracic and abdominal viscera. The contrast not only artistically but anatomically between these wretched attempts by men who presumably possessed a knowledge of the anatomy they professed to teach, and the accuracy as well as artistry of the drawings of the man who had received no formal training as an anatomist is remarkable. There is no doubt that the association of the artists in the same guild with the doctors and apothecaries brought the former in contact with men who studied anatomy such as it was, but if this awakened the artists' desire to know more of the structure of the human body and led them to practice dissection, why did not the converse hold, and the doctors become stimulated by what artists like Leonardo, Michael Angelo and Dürer were doing, to do better work themselves? Undoubtedly the intimacy of Leonardo with Marc Antonio della Torre, the anatomist of Pavia, helped him and stimulated his interest in anatomy, but his notebooks show that his own interest was great and that he used his brain and hands as well as his artistic ability to acquire the knowledge which was so terribly lacking in the members of the profession to whom it was most necessary.

McMurrich devotes a chapter to the methods employed by Leonardo in his anatomical studies. He thinks that though he used wax injections to study the ventricles of the brain, there is no evidence to show that he injected the blood vessels. Chapter VIII deals with Leonardo's ideas on general anatomy and physiology. Although he presents some original ideas, such as his discovery by dissection of the difference between the blood vessels of an old man and those of young children, contrasting the hard, tortuous vessels of an arteriosclerotic, with the soft vessels he had found in the young, as a general thing his conceptions were Galenic.

As an artist Leonardo was deeply interested in formulating a canon of proportion for the human body, and Chapter IX is given over to a study of his efforts in this direction. McMurrich points out there had been previous studies by artists in this direction but thinks that his chief inspiration was due to the writings of Vitruvius, the Roman architect of the Augustan period. Two editions of the great architect's works were published in Italy, in 1486 and 1494, and they were readily accessible to Leonardo who, however, carried the study much further than had ever been done heretofore.

The following chapters deal consecutively with Leonardo's studies of the Skeleton, Muscles, Heart, Bloodvessels, Organs of Digestion, Organs of Respiration, Excretory and Reproductive Organs, Nervous System, and Sense Organs, with chapters on his studies in Embryology and Comparative Anatomy.

With Leonardo's knowledge of the laws of mechanics and physics it is remarkable that studying the heart and circulation as thoroughly as he did he missed the truth which Harvey discovered. It was the old bugbear begot by Galen, the "pores in the ventricular septum" which obscured the truth for Leonardo as for many others.

The book is completed with an exhaustive list of references and an excellent index.

The large number of well reproduced illustrations add greatly to its value. It is a splendid contribution to a subject which in spite of its great importance has not hitherto met with adequate treatment. Not only to students of medical history but to those who are interested in the history of the art of the Renaissance, or in the great personality with whom it deals Dr. McMurrich's work will be of the greatest value.

Francis R. Packard.

A Brief History of Medicine in Massachusetts. By Henry R. Viets, M.D. With illus., Boston, Houghton, Mifflin Co., 1930.

In his Preface Dr. Viets states that this book is a contribution by the Massachusetts Medical Society to the Tercentenary Celebration of the settling of the Massachusetts Bay Colony, and we may add it is a most valuable one. The author has long been known as a thorough and accurate student of medical history and this piece of work is worthy of his reputation. Beginning, as every study of the Massachusetts Colony must, with the voyage of the Mayflower in 1620, he tells of "Doctor" Samuel Fuller, one of the ship's passengers. Whether Fuller ever got a medical degree anywhere is doubtful, but at any rate he was generally regarded as a physician as well as an influential deacon of the church, and he certainly was the chief medical advisor of the Colonists. Although some have thought that during the eleven years he passed at Leyden, then a great medical center, he may have studied medicine, there is no positive or even probable evidence of his having done so. The Mayflower was accompanied by a barber surgeon who had received his license from the Guild of Barber-Surgeons of London in 1619. This was Giles Heale, who was the ship's surgeon. He did not remain long in the Colony, returning to London on the Mayflower in April, 1621. Samuel Fuller's third wife practiced midwifery and in that capacity must have been of very real assistance to her husband in a community where birth-control was far from the practice. From Fuller's death in 1633, there was no outstanding physician in Massachusetts for nearly one hundred years. The medical situation was evidently a source of concern to John Winthrop, for he wrote to London requesting medical information from Edward Stafford, who in reply sent him a long communication retailing advice on how to practice a sort of domestic medicine, largely copied from Gerard's "Herbal." John Winthrop the younger, was also deeply interested in medical matters and Viets gives several of his letters giving medical advice to different colonists. Medicine was largely, like everything else in the Colony, in the hands of the ministers. The Reverend Thomas Thacher, had the honor of publishing the first medical treatise in America. His leaflet or broadside entitled, "A Brief Rule to guide the Common People of New-England how to order themselves and theirs in the Small pocks or Measles," was abstracted without acknowledgment from the writings of Sydenham, but at any rate as Viets says he selected a good model. It has been frequently republished. The Apostle Eliot and Giles Firmin, were two preachers who also practiced medicine. The latter was probably the first to give formal anatomical instruction in this country. It is hard to ascertain the real nature of the diseases which prevailed in the Colony because of indefinite nomenclature. Thus "Fever" was the usual diagnosis, but we hear much of smallpox, and a "throat distemper." In 1721 Zabdiel Boylston introduced inoculation for smallpox, and from about that time many really qualified and excellent physicians appear in the Colony. In 1735 a medical society was organized in Boston. It only lasted four or five years and published no transactions. Among the trained men who practiced in Boston in the eighteenth century Viets gives details about Silvester Gardiner, who had studied under Cheselden, and in 1741 operated for urinary calculus; William Douglass, a Scotchman who had studied in Edinburgh, Paris and Leyden, and was for some years the only practitioner in Boston who had received the degree of M.D.; James Lloyd, studied under Cheselden, Smellie, and the Hunters, and kept up a correspondence with John Hunter until the latter's death in 1793. Gardiner and Lloyd were both Tories, and the former went to Halifax with the British when they evacuated Boston. Lloyd remained in Boston and continued to have a large practice there after the Revolution was over. A Boston doctor, Benjamin Church, was the first director general of the Medical Service of the Continental Army. Unfortunately he was found guilty of treasonable correspondence with the enemy. He was shipped off to the West Indies but as the ship he sailed in was never heard of it is supposed he was lost at sea. Joseph Warren, a prominent young physician of Boston, was killed while serving as a general of the militia at Bunker Hill. His brother John Warren was later to be one of the chiefs in establishing the Harvard Medical School and the Massachusetts General Hospital. In 1781 he aided in founding the Massachusetts Medical Society, one of the chief services of which was to found a medical library, which many many years later became a valued part of the Boston Medical Library. The Harvard Medical School was founded in 1782, with John Warren, Benjamin Waterhouse and Aaron Dexter, as its first faculty. The eccentric Waterhouse is generally credited with having been the first to introduce vaccination for smallpox into New England. The high standing of the Harvard Medical School was sustained for many years by another Warren, John Collins Warren, and his close friend James Jackson. Viets draws due attention to the introduction of French influence into New England medicine during the decade from 1830 to 1840. Louis' influence was great at Boston and New York as well as in Philadelphia. The medical dynasties which ruled Boston medicine during the course of the nineteenth century are fully described by Viets. Besides the Collins family, there were the Bowditchs and the Shattucks, all of them men of ability and outstanding personal characteristics which were for the best ideals in medicine. In 1846 the Massachusetts General Hospital had the glory of the first public demonstration of the use of ether as an anesthetic. The operation was performed by John Collins Warren, then in his sixty-ninth year. Dr. Viets continues the story of medicine in Massachusetts down to the immediate present. His work is a valuable contribution to the medical history of the United States. Although necessarily concise it is written with charm. An excellent index adds to its value.

Francis R. Packard.

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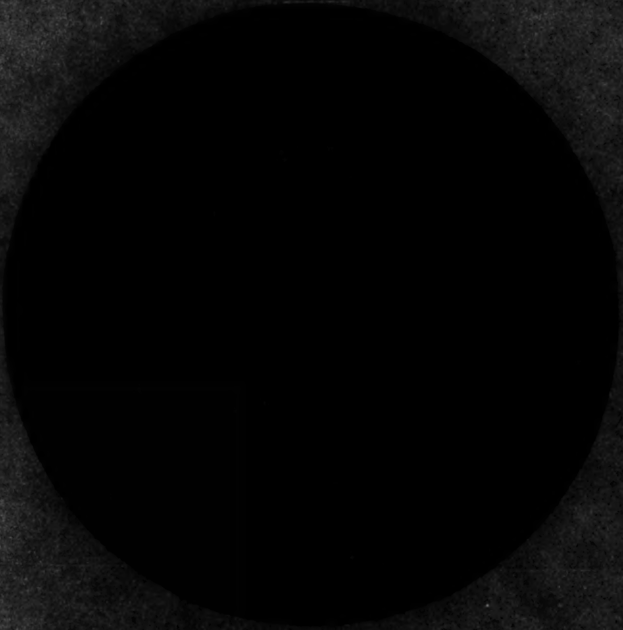

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CH. ALPHONSE LAVERAN
[1845-1922]